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ABSTRACT

This paper is the summary report of a seminar which was held in Kenya at the Institute for Development Studies of the University of Nairobi from June 2-19, 1976. The seminar was sponsored by USAID through a contract to Cornell University in Ithaca, New York. Ten English-speaking African countries, whose responsibilities are related to nutrition planning and policy making, were represented by government officers and employees of non-government agencies. Short summaries of the sessions conducted by the seminar staff members are included. Salient nutritional problems of Africa and their complex causes, the socio-cultural factors which influence these problems and their alleviation, and the basic economic considerations relating to the cause and control of malnutrition and food shortages were addressed. However, planning and policy relating to nutrition was the main focus of the seminar. The participants formed working groups and prepared short reports on nutrition planning for Tanzania's Ujamaa villages, on nutrition activities and goals in Kenya, on increased wheat consumption and the trend toward bottle feeding in West Africa, and on nutrition activities in the Sudan. The working group reports are included. (Author)

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NUTRITION PLANNING AND POLICY FOR AFRICAN COUNTRIES

Summary Report of a Seminar Held in Nairobi, Kenya, June 2-19, 1976

Edited by:
Michael C. Latham and Sidney B. Westley

Cornell International Nutrition
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Summary Report of a Seminar Held at the Institute for Development Studies,

University of Nairobi, Kenya, June 2-19, 1976

Edited by:

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This Seminar was funded under a Contract from the Office of Nutrition, U.S.A.I.D., Washington, D. C., awarded to the Division of Nutritional Sciences of Cornell University. The Institute for Development Studies of the University of Nairobi served as host institute. This monograph with small modifications is appearing simultaneously as Occasional Paper No. 21 of the Institute for Development Studies, University of Nairobi.

ABSTRACT

This paper is the summary report of a seminar which was held in Kenya at the Institute for Development Studies of the University of Nairobi from 2 to 19 June, 1976. The seminar was sponsored by USAID through a contract to Cornell University in Ithaca, New York. Participants were government officers and employees of non-government agencies from ten English-speaking African countries whose responsibilities are clearly related to nutrition planning and policy making.

The report includes short summaries of the sessions conducted by the seminar staff members. Some of these sessions were devoted to the salient nutritional problems of Africa and their complex causes, to socio-cultural factors that influence the condition and its alleviation, and to the basic economic considerations relating to the cause and control of malnutrition and food shortages. However, much more time was devoted to planning and policy relating to nutrition. The participants formed working groups and prepared short reports on nutrition planning for Tanzania's Ujamaa villages, on nutrition activities and goals in Kenya, on increased wheat consumption and the trend toward bottle feeding in West Africa, and on nutrition activities in the Sudan. The working group reports are also included in this monograph.

NUTRITION PLANNING AND POLICY FOR
AFRICAN COUNTRIES

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PURPOSES OF THE SEMINAR

The Seminar was designed for participants from English-speaking countries in Africa whose work is clearly relevant to national or regional nutrition planning and policies. The Seminar attempted to provide a broad view of the many issues and problems related to poor human nutrition, but especially concerned itself with those that relate to planning designed to combat malnutrition. A little time was devoted to the salient nutritional problems of Africa and their complex causes, to socio-cultural factors that influence the condition and its alleviation, and to the basic economic considerations relating to the cause and control of malnutrition and food shortages. However, much more time was devoted to planning and policy relating to nutrition.

A model of the planning process was offered, and the way in which nutrition is linked with other development policies was discussed. The maximum amount of discussion and participation by those attending was encouraged at all sessions. Field visits and special sessions were planned. The participants also worked in groups to prepare plans or strategies for one country or district, or to solve a set of problems. These plans were then presented to all those attending, including the staff, and were discussed in plenary sessions.

SPONSORS AND ORGANISERS

The Seminar was funded by the Office of Nutrition of USAID under a contract to the Division of Nutritional Sciences, Cornell University, Ithaca, New York. Professor Michael C. Latham, Professor of International Nutrition at Cornell, and at the time of the Seminar a Visiting Professor at the University of Nairobi, was the Principal Investigator with overall responsibility for the Seminar organisation. The Seminar was run in collaboration with the Institute for Development Studies (IDS) of the University of Nairobi.

OPENING REMARKS

Prof. Michael Latham, Seminar Director

I was impressed by something that Richard Leakey, Director of the National Museum of Kenya, said a few days ago when talking about the origins of man some one to three million years ago. He stated that he was convinced that the single human characteristic that had contributed most to man's survival as a species was not his aggression and love of war, but rather his ability to share and to live and work communally.

This fine human characteristic of sharing is terribly important in many spheres of human life and human endeavor, but it is absolutely vital in nutrition and for the nutritional survival of man. There must be a sharing of food at the family level, and it is, I believe, an innate human characteristic for a mother to be willing to go hungry while giving the little available food to her child. But food needs to be shared and equitably distributed also at the village, the district,

the regional, the national and the international level if there is to be justice in the world, and sharing as a necessary feature of nutrition must go much further than simply the sharing of food.

There must be a sharing of knowledge (knowledge about food, about agriculture, about health); there needs to be a sharing of technology, something the rich nations were reluctant to agree to here at UNCTAD; there should be a sharing of land and natural resources; and also a sharing of services and of opportunities.

Perhaps nowhere on earth is this spirit of sharing with one's brothers and sisters more embedded in the culture than here in Africa. I have been impressed by the hospitality that is shown to a wayward relative, to the old, the weak and even the insane. In North America or Europe these people are sequestered away in old people's homes or insane asylums.

In Tanzania you talk of ujamaa or familyhood, in Kenya of harambee or self-help nation building, and in Zambia of humanism. These related themes of brotherhood and sisterhood, of persons helping themselves, helping others and the nation, are all strong threads which are important to the fabric of African development and nationhood. This is despite the fact that the countries of free Africa have very different political systems and ideologies.

In nutrition too, there exist very different mechanisms used by governments for the formulation and implementation of national food and nutrition policy. Tanzania has established a National Food and Nutrition Centre as a parastatal body entrusted with coordination of nutrition policy and plans; Zambia soon after independence set up a National Food and Nutrition Commission; other African countries have taken different (and often smaller) steps in efforts to establish national nutrition policy and to coordinate nutrition programmes and activities.

The benefit of bringing together, for the present seminar, a group of people from ten English-speaking countries in Africa is that each has something to learn from the other. Every participant has a different experience and background and each country is approaching its problems in a different way. The main objective of a meeting such as this is to allow a sharing of experience, of knowledge, of ideas. This is the sharing that is so important. There is to be no suggestion that all people and all countries should change in order to follow or to satisfy one nutrition model.

In the past, nutrition was often viewed as the responsibility of the Ministry of Health. Kwashiorkor, which was in the spotlight in the 1950s and 1960s, was seen as a medical problem requiring medical treatment and health prevention. It was believed that the hospital and health worker could conquer this disease. Medical workers have conquered smallpox, once a great scourge of mankind.

But malnutrition, especially protein-calorie malnutrition, is as prevalent in Africa today as it was a decade or two decades ago, despite

all our development efforts. One problem is that malnutrition cannot be conquered by doctors and health workers alone. We as doctors have a very important role to play, but it will take the efforts of specialists in agriculture, in community and rural development, in social services and education, in ministries of finance and planning, and not least in politics to solve the nutrition problems of the continent. So again there must be sharing and cooperation between ministries and between people of different disciplines.

Malnutrition is so closely related to poverty and deprivation and to inequalities and maldistribution of resources that it can have no easy solution. Yet improved nutrition will contribute to national development, and national development will reduce the prevalence of malnutrition. I have argued before that a nation's infant mortality rate and its incidence of malnutrition are better indicators of its national development than are the number of television sets or automobiles per 1000 people or the gross national product or industrial output.

Because an attack on the problems of malnutrition requires a sharing of experience and a number of strategies, I welcome here today delegates from Nigeria, Ghana, Liberia and the Gambia in the west; from Tanzania and Botswana to the south; from the Sudan and Ethiopia to our north; and of course from Kenya; plus staff and observers from North America and Europe. But I am equally pleased to welcome here participants from different disciplines: from agriculture and health, from social welfare and economic development ministries, from the fields of planning and of education, from departments of nutrition, biochemistry and food science, and not least from the political arena.

This meeting will not have failed if with open minds there can be a sharing of experiences from the different countries and among the several disciplines represented here.

I wish first to thank our host country, Kenya, for providing a very excellent setting for this Seminar on Nutrition Planning and Policy. We are also very grateful to the University of Nairobi and its Institute for Development Studies for serving as hosts and local sponsors of this important meeting. I would like especially to thank Professor D. Odhiambo the Deputy Vice Chancellor and Dr. Peter Hopcraft the Acting Director of the Institute for Development Studies. The Seminar is financed by a grant from U.S.A.I.D. to Cornell University. The interest of A.I.D. in nutrition deserves our recognition, and my thanks to Mr. Michael Rugh and Miss Marion Frazao of U.S.A.I.D. for their assistance.

I would like to thank, in advance, the various staff members who have, or will, come to assist with the seminar; they are Professors Robinson, Nesheim and Sanjur from Cornell, Dr. Maletnlema from Dar-es-Salaam, Dr. Morgan from England, Professor Slater from Colorado and Mr. Pines from Washington. I am grateful to Ms. Sidney Westley of I.D.S. who has the unenviable task of being our rapporteaur and to Mrs. Josphine Kamau, Senior Administrative Assistant at I.D.S. And

I must pay special tribute to the man behind the scenes, my colleague Bob Adams who came from Ghana to serve as Seminar Administrator.

But my very special thanks go to you the participants who are to take nearly three weeks out of your busy calendars to be here in Nairobi to share your experiences as part of an effort to improve the nutrition of your people.

Dr. S. Kanani On Behalf of the Kenya Ministry of Health

I would like to extend a warm welcome to the visiting participants to this Seminar on Nutrition Planning and Policy for African Countries. The Ministry of Health in Kenya has recognised the importance of nutrition since 1964 when the Ministry, with the assistance of nutrition specialists from W.H.O., carried out a study directed towards the problems of nutrition. As a result of that study, the Ministry of Health decided to take initial steps to try to reduce the country's nutrition problems through, among other things, an education project.

Thus, in 1968, the Ministry of Health embarked on a training programme that consisted of training experienced nurses/midwives in nutrition, and as a result a cadre of "Nutrition Field Workers" was created to carry out nutrition educational activities at the health-centre and hospital MCH clinics. To date approximately 150 nutrition field workers have been trained.

It is, however, the Ministry's view that the nutrition problem is still a big one and that more needs to be done. Many meetings, workshops and seminars have been held concerning this issue and they have resulted in the production of a lot of written materials, but there appears to be no follow-up to these voluminous reports.

The Kenya Ministry of Health therefore looks forward to this Seminar's deliberations and conclusions, and hopes it will be much more action-oriented, rather than talking-oriented.

Finally, I would like to extend our appreciation to the organisers of the Seminar for providing this very useful opportunity to formulate nutrition planning and policy for the countries of Africa.

Dr. Peter N. Hopcraft, Acting Director of the Institute for Development Studies of the University of Nairobi

It is surprising the extent to which development policies and programmes, and even development research in a number of our countries, have ignored the problems and the needs of the poorest segments of our societies. The whole process of economic development is presumably aimed at increasing human welfare, and while the achievement of this goal is ultimately dependent on increasing the productivity of our economies, it also suggests that our productivity and increases in productivity should result in improvements in the welfare of those who are least well off.

The topic of this seminar is perhaps the most basic of hu needs. There are few things more central to human welfare tha tion. Some of us might be better off if we had less to eat or but for those at the bottom end of the income scale improved n is a major, perhaps the major, element in improved welfare. A are currently many more people being added to the lowest incom of our societies than to the highest.

This seminar represents a recognition by all of you, and by the Institute for Development Studies, that human welfare, particular the nutrition and feeding of our populations, is no a legitimate focus, but is a principal topic for explicit gove planning and policy-making.

It is a topic that reaches into many aspects of national There is a pervasive myth that the answer to nutrition problem food give-away programmes. Such programmes are absolutely nec in times of crisis, but they are less a component of adequate tion planning and policy than an indication of its failure. I far more central to nutrition relate to food and agriculture p tion, marketing and pricing, to education and extension measur public health monitoring and to other measures which will iden problems and prevent them before they reach crisis proportions

The programme of this seminar has been designed to cover multiple aspects of food and nutrition planning and policy-mak countries such as ours. We look forward to your deliberations hope to publish your proceedings in a form that will make them available to those who cannot be with you in the next three we who are deeply concerned with the issues you are addressing.

SUMMARIES OF SESSIONS CONDUCTED BY THE SEMINAR STAFF

NUTRITIONAL PROBLEMS OF AFRICA AND SOME ORDERING OF THEIR IMPORTANCE

by
Michael Latham

Introduction

At the World Food Conference in 1974 it was stated that 5 million people in the world are underfed. Accurate figures of undernourished and malnourished are not available and depend a definitions of the terms used. Too little is known about the " of nutrition" of both rich and poor countries, and this is cer true of all African countries. Both quantitative and qualitati information is lacking.

But even without these data it is all too evident that und nutrition and malnutrition are extremely common in most of Afri Asia and Latin America. It is an especially common problem in children, where it may be relatively hidden and is often close lated to infections.

In this first session of the Seminar it may be useful briefly to consider the major nutritional problems of sub-Saharan free Africa and then to attempt in broad terms to order their importance. In this session the complex aetiology and the ramifications of underlying causes of malnutrition will not be considered.

Diseases Related to Nutrition

There are a huge number of diseases which are in some manner related to nutrition These include:

(a) The deficiency diseases of which there are more than fifteen, including common ones such as kwashiorkor, marasmus, xerophthalmia, goitre, various anaemias, pellagra and aryboflavinosis; less common ones such as scurvy, rickets and beriberi; and rare diseases such as deficiencies of pantothenic acid, biotin, vitamin B_6, zinc and others.

(b) The nutritional diseases of affluence such as obesity, coronary heart disease and dental caries. These are all very much more common among wealthy, and/or Westernised populations.

(c) The chronic diseases in which nutrition plays an important role (e.g., diabetes, hypertension, inborn errors of metabolism, etc.).

(d) Those diseases in which dietary treatment is important (e.g., peptic ulcer, liver disease, renal disease, etc.).

(e) The diseases which are aggravated by malnutrition. (Very few diseases can be excluded, but the ones commonly described are diarrhoea, measles, whooping cough and tuberculosis.)

Nutritional Diseases of Special Importance to the Planner

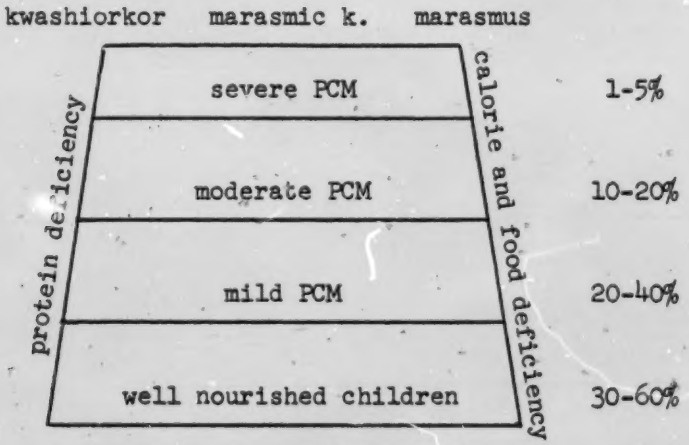
Nutrition plays a significant role in perhaps 40 percent of diseases treated in hospitals in affluent countries and probably 70 percent of those in low-income countries. Despite this fact, there are only a limited number of these disease conditions which are of major practical importance either for the public health physician or the nutrition planner.

W.H.O. has listed four deficiency diseases as deserving the highest priority in developing countries. These are protein-calorie malnutrition, endemic goitre, vitamin A deficiency and nutritional anaemias.

Protein-calorie Malnutrition (PCM): There is no doubt that this is the most important nutritional problem in most African countries. It occurs in a number of forms: the extreme cases of kwashiorkor,

nutritional marasmus and marasmic kwashiorkor and the mild or moderate cases in which there is growth retardation. Malnutrition, unlike many other diseases, is not either present or absent. Instead it covers a wide spectrum from very mild to very severe, and mild or moderate cases are at higher risk of progressing to the more severe forms. In many African countries 1 to 5 percent have severe PCM, 10 to 20 percent have moderate PCM, and 20 to 40 percent have mild PCM. The disease can be visually represented by an iceberg or a pyramid. The exposed or top portion includes those with severe malnutrition. Because of its complex aetiology and relationship to poverty, deprivation and infectious diseases, it is relatively difficult to control.

Figure 1. Incidence of protein-calorie malnutrition in many African countries



Endemic Goitre: This is due to iodine deficiency and is relatively common in certain areas of Africa. Women with iodine deficiency have an increased risk of producing children who are mentally retarded, deaf mutes or cretinous. Control is relatively easy using iodised salt.

Xerophthalmia (Vitamin A Deficiency): This is a major cause of childhood blindness. Its prevalence in most African countries has not been determined. Control is feasible, but not always easy. Several possible approaches exist, including periodic massive dose administration to children at risk, fortification of suitable foods, horticultural activities and public health measures.

Nutritional Anaemias: These are very prevalent, especially iron deficiency anaemia (sometimes secondary to hookworm infections). Folate deficiency may be common during pregnancy. Ease of control varies according to the cause and the particular group of the population involved.

Pellagra: This results from niacin deficiency and still occurs quite frequently, especially among poor maize-eating people. Control is feasible, but not easy.

Riboflavin Deficiency: This is extremely common, but it carries very little morbidity and no mortality. Prevention is possible, but is not simple.

Rickets: This results both from a deficiency of Vitamin D in the diet and lack of exposure of the skin to sunlight. It occurs quite commonly in certain areas of Ethiopia, but is uncommon in most of Africa. Prevention is fairly easy.

Dental Caries: This is extremely prevalent among those consuming a Western diet, but much less common among those living on traditional African diets. An adequate intake of fluoride will reduce the amount of dental caries but not prevent it. Fluoridation of water supplies is a good control measure.

Starvation: This occurs sporadically in Africa due to natural and man-made disasters.

Ordering of Importance of Deficiency Diseases

It may be useful to reach some agreement on the relative importance of some of these diseases in terms of: (a) their prevalence, (b) their case fatality rates, (c) their social significance, and (d) the ease of control. The seminar group agreed in general to the ordering of importance depicted in Table 1.

A table such as this one for each country, area of a country or population group will be very useful for the planner and policy maker. In constructing such a table, existing incomplete data will be consulted and very rough estimates made. Usually there is sufficient information to allow calculated guesses.

UNDERLYING CAUSES OF MALNUTRITION AND DIAGNOSIS OF THE NUTRITION SITUATION

by
Michael Latham

Nutrition planning must start with the identification of the nutrition problem in terms of who is malnourished, in what ways, in what circumstances and why.

Seldom is there complete data, and a lack of it need not inhibit the initiation of planning decisions nor the choice of strategies. In too many countries huge amounts of money have been spent on surveys without an appropriate sum being available to finance the programmes necessary to solve the problems found by the surveys. Nutrition in Africa might be much better if children could digest cellulose and could eat all the survey reports and non-implemented nutrition plans that have been produced. As a general rule of thumb it is suggested that for every 1,000 dollars spent on nutrition surveys at least 10,000 dollars should be spent on nutrition programmes.

Table 1. Ordering of importance of deficiency diseases

	Prevalence (in at-risk population)	Case Fatality Rates	Social Significance	Ease of Control
1. PCM (mild/moderate)	+++++(above 30%)	++(3-10%)	+++++	+
PCM (severe)	++(2-10%)	+++++(above 20%)		
2. Vitamin A deficiency	+++(10-20%)	+++(3-10%)	++++	++++
3. Nutritional anaemias	++++(20-30%)	+(0-1%)	++	++
4. Endemic goitre	+++(10-20%)	-(except in cretinism)	+++	+++++
5. Rickets[1]	+(0-2%)	+(0-1%)	++	++
6. Riboflavin deficiency	+++++(above 30%)	-	-	++
7. Scurvy	+(0-2%)	+++(3-10%)	+	++
8. Pellagra	++(2-10%)	+(0-1%)	++	++
9. Beriberi	+(0-2%)	+++(3-10%)	+++	++
10. Dental caries[2]	++++(20-30%)	-	+	+++
11. Starvation[3]	++	++++	+++++	++

1. Common in parts of Ethiopia.
2. Related to affluence and Western diet.
3. Localised and varied according to local disasters (drought, war, etc.).

It is, however, important to establish a statistical framework which defines the socio-economic components of the national nutrition problem. For such a purpose it may be useful to utilize the illustrative outline of "functional classifications" of an undernourished population presented in Table 1.

Table 1. Illustrative outline of "functional classification" of undernourished population as a basis for food and nutrition planning

1. Regional divisions - based on administrative structure

2. Ecological sub-zones

   including, e.g., urban
   rural accessible - irrigated; unirrigated
   rural inaccessible - arable; grazing
   as well as subdivisions by cropping areas

3. Economic status of sub-groups of population

   including, e.g., urban - migrants recently arrived
   - poor, stable employment: in large firms
   in small firms
   - poor, unstable employment or unemployed
   - income above subsistence
   rural - settled farmers - "surplus" farmers
   - "deficit" farmers
   - nomads

4. Demographic categories within sub-groups

   including, e.g., mother - child (infants)
   pre-school children
   school-aged children
   adults - male
   - female
   elderly

5. Deficiency pattern

   chronic
   seasonal
   occasional

6. Nutrient deficiency (or problem)

protein-calorie	calcium
vitamin A	iron
riboflavin	iodine
vitamin C	(lathirysm)

Source: Leonard Joy, "Food and Nutrition Planning," Journal of Agricultural Economics 14(1), January 1973.

A beginning might be made by specifying what is known about the incidence of malnutrition in each of the classes listed. Very little data may be available about certain categories but in general the existence of serious problems will be known.

Causes of Malnutrition

In order to formulate an effective food and nutrition policy and appropriate strategies there must be an analysis, however simple, of the existing situation. This needs to be presented in terms of the causes of the problem. Without this there is no operational meaning for the planners.

This is where there has so often been a failure in the past. Until quite recently, physicians and nutritionists, as well as the international agencies, have tended to look little further than the immediate causes of malnutrition. There has often been a failure to look for, or to describe, the underlying causes of the malnutrition seen.

There has been a tendency to say, for example, that protein-calorie malnutrition was due to a low intake of calories and protein or that xerophthalmia was due to a diet deficient in carotene or vitamin A. This is true, but such a diagnosis has rather little operational meaning. Children more often than not are malnourished because their parents are poor and they live in circumstances which make them more liable to suffer from infectious diseases. They are deprived of an adequate food intake but suffer other related deprivations as well.

It is necessary to know whose intakes are low and why they are low. It is always desirable to explore the underlying causation, remembering that there may be a complicated web of causes. An example of some of the factors in the causation of protein-calorie malnutrition is given in Table 2 to illustrate this point.

Our investigations in the past have always tended to explore the reasons why certain children in the community have protein-calorie malnutrition, or other forms of malnutrition. We have looked at the negative and not the positive. It may be more useful for planning purposes to look at those 20 to 40 percent of children in a poor community who are well-nourished, rather than the 60 to 80 percent who are malnourished. How do these children manage to be well-nourished when they too live in poor households with few facilities? The characteristics which distinguish these families from others in the village may provide the key to an intervention which would be appropriate in assisting those children in the community who are malnourished.

Assessment of Nutritional Status of the Community

A variety of forms of data may help in the assessment or diagnosis of the nutritional situation in a community.

Table 2. Some factors in the causation of protein-calorie malnutrition

A. Relating Especially to Kwashiorkor

1. Rapid growth - relatively high protein requirements (a one-year old child needs 2 g. protein and an adult only 0.5 g. per kilogram body weight)

2. Dietary deficiency of protein and calories

   (a) Protein-poor staple food, e.g., plantain, cassava (manioc)
   (b) Poor infant feeding practices
   (c) Lack of protein-rich foods of animal origin
   (d) Poor supply of legumes, etc.
   (e) Poor distribution of food within the family
   (f) Poverty - unemployment, land shortage, low purchasing power
   (g) Seasonal food shortages - hungry season
   (h) Taboos and cultural factors

3. Infection - diarrhea, parasites, infectious diseases, etc.

4. Lack of knowledge - of child feeding, health protection, etc.

5. Psychological - displaced child

6. Therapogenic - harmful home or medical treatment of diseases

B. Relating Especially to Marasmus

1. Failure of breast feeding - death of the mother; separation from the mother; lack or absence of breast milk

2. Bottle feeding

3. Starvation as treatment, especially for diarrhea

4. Other diseases - tuberculosis, mental defects

5. Prematurity

6. Severe food shortage - famine

7. Late introduction of other foods to a breast-fed infant (Breast feeding alone is adequate only for four to five months.)

These can be summarised as follows:

(1) Clinical, anthropometric and laboratory tests
(2) Dietary or food consumption data
(3) Vital statistics - morbidity, mortality, demographic data, etc.
(4) Additional health statistics and medical information
(5) Agricultural data relevant to food production and availability including food imports, national, regional and local food balance sheets
(6) Economic data related to purchasing power, food prices, food distribution and food storage. In some cases household budgetary surveys may be useful.
(7) Socio-cultural data including food consumption patterns, food practices and food beliefs
(8) Food science information such as the nutrient content of foods, the biological value of the protein in diets, the nutritional consequences of common processing or milling practices, and the presence of toxic or harmful factors such as aflatoxin or goitrogens.

Finally it might be possible to design and establish a nutritional surveillance system using key indicators relating to several factors listed in Table 2.

FOOD POLICIES DESIGNED TO IMPROVE NUTRITION

by
K. L. Robinson

An essential component of any nutrition programme is to increase the availability of food to those most at risk. Simply increasing total agricultural output, however, will not necessarily lead to an improvement in the diets of those who are now short of calories or protein. To reach this group, a reorientation of production goals may be required with more emphasis given to increasing output in certain high-risk areas, and to altering the composition of output towards low-cost sources of nutrients, such as cereals, roots and tubers, and pulses.

For the world as a whole, food availability has improved somewhat since the disastrous crop years of 1973-74. Import prices (which are a sensitive indicator of the overall supply/demand balance) for such internationally traded commodities as rice, wheat, maize and soya beans have declined over the past year. Storage or reserve stocks of grains, while still far from adequate to cope with a major shortfall in production, have increased in the United States. Thailand is now experiencing difficulty in finding markets for all of her surplus rice, and stocks of skim milk powder have become so large and expensive to maintain in Europe that some of these surpluses are now being converted into animal feed. World prices of vegetable oil have also declined because of increased production of soya beans in Brasil and palm oil in Malaysia.

The situation in Africa, however, is less favourable. UN/FAO figures indicate stable or declining per capita food production in many

African countries over the past decade, and rising imports of cereals (especially wheat or wheat flour, and rice). Food prices also have been increasing relative to non-food items, another indicator of lagging food production. Most governments have responded to this situation by giving a much higher priority to increasing food production than prevailed in the past.

Complete self-sufficiency in food supplies is probably neither desirable nor attainable for most West African countries, but there are compelling reasons for reducing dependence on food imports, both to reduce risks and to avoid balance of payments deficits. It is uneconomic to attempt to produce wheat in most West African countries, but some reduction in imports may be achieved by appropriate price policies which encourage the substitution of rice, maize and cassava products for wheat.

Production targets in the past have been based mainly on economic projections of demand. With rising incomes and increasing urbanisation, families tend to buy more livestock products (which leads to an increase in demand for grains and oilseed products to manufacture livestock feed, or to increased imports), sugar and "convenience foods" such as bread and rice. Too little attention has been paid to producing commodities which constitute the basis for the diet of those falling in the "at risk" category. Thus one of the first requirements of a nutrition-orientated food policy is to give more emphasis in production plans to increasing the output of crops which provide calories and protein at low cost. These crops include maize, sorghum, millet, cassava, cowpeas, beans and pigeon peas.

Agricultural research priorities may need to be altered as well. Past research has emphasized export or cash crops rather than indigenous food crops. Only recently have scientists begun to develop higher yielding varieties of cassava, cowpeas, yams and pigeon peas. Attempts are now being made to select crops for resistance to insects and disease and tolerance to drought, as well as the capacity to respond to mineral fertiliser. In general, efforts to increase the protein content of grains and cassava have been disappointing. At this stage of development it is more important to increase total yield than to alter the protein content or amino acid balance of the more important food grains or cassava.

Price incentives are another important aspect of food policies designed to improve nutrition. In some cases, farm prices have been held down by governments seeking to protect urban workers and civil servants. The effect all too often has been to discourage increases in food production. A modest increase in the price of food crops relative to non-food crops may be required to provide the necessary incentives (and capital) for farmers to increase output.

The relationship between food-crop prices and the cost of fertiliser is also important. If farmers are to be encouraged to use fertiliser, crop and fertiliser prices (or subsidies) must be established at a level which will enable a farmer to purchase a kilogram of nitrogen (N) in whatever form it is available locally for no more than five

kilograms of grain (or the grain equivalent of roots and tubers). Fertiliser availability likewise is an essential component of most crop improvement programmes.

Crop losses after harvest contribute both to sharply rising prices for food before the next harvest season and to actual shortages in some areas. Thus, an integrated food and nutrition programme must also include measures to improve storage facilities, especially on farms where food is now sold at harvest and bought back later at a much higher price. The development of low-cost storage methods and demonstration projects to show farmers how to reduce losses has the potential of increasing food availability by as much as ten or fifteen percent.

High marketing margins are universally condemned by farmers, planners and nutritionists. Studies of food marketing costs in Africa as well as in Asia have shown margins are high, mainly because it is expensive to assemble supplies from small producers who are widely scattered. In addition, transportation costs are high due to head-loading, expensive petrol and high maintenance costs of vehicles. Cooperatives or government agencies can perform a useful service in offering farmers an alternative outlet for their products and reducing monopoly profits. There may also be compelling social and political arguments for government intervention in marketing and distribution; however, the promised gains often turn out to be illusory due to high costs and the lack of necessary managerial skills.

Improvements in roads and village or local water supply facilities are likely to have a higher pay-off in terms of improved health and nutrition (including lower food prices for urban consumers) than interventions in marketing. More and better feeder roads in areas of high production potential can lead to an increase in food supplies for urban areas. More accessible and improved water supplies also may increase agricultural productivity by enabling women and children to contribute more labour at critical periods such as at planting time.

In summary, an integrated programme designed to reduce malnutrition would, in my view, give priority to (1) redirecting and expanding agricultural research efforts with the objective of increasing the potential output of cereals, root and tuber crops, and pulses; (2) establishing and maintaining floor prices under food crops so as to give farmers an incentive to increase output; (3) insuring that sufficient supplies of fertiliser of the appropriate kinds for food crops are ordered and distributed in rural areas in time to be of use to farmers; (4) improving on-farm and local storage facilities; (5) extending and upgrading farm-to-market roads; and (6) constructing village water supply systems.

Economists working in cooperation with nutritionists can also assist planners in assessing the relative cost and effectiveness of alternative types of food intervention programmes such as school lunch programmes, supplemental feeding programmes operated through day-care or maternity and child health centres, and ration food shops in which certain commodities are made available at low or subsidised prices, especially in urban areas. Formal benefit/cost analysis is limited in its usefulness

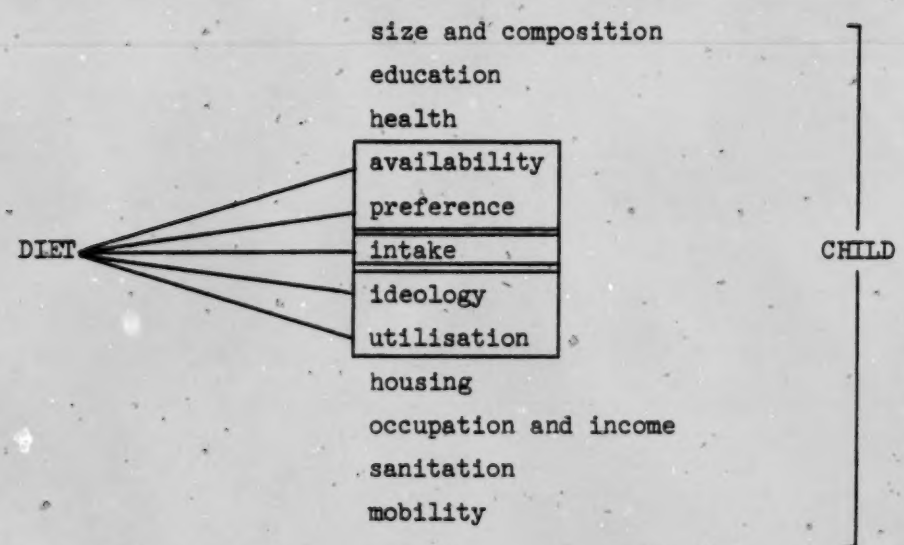
because of the difficulty of quantifying the sum of benefits and converting these into value units. Furthermore, this technique ignores some of the important questions which ought to be raised with regard to the distribution of benefits. In deciding on which of several alternative types of food intervention programmes to introduce or expand, it is useful to prepare a matrix in which the relative effects of different programmes can be compared. It is not necessary to forecast precisely how many individuals will benefit from a particular programme, but it is important to be able to rank programmes on the basis of their nutritional impact. Participation rates or the quantity of food distributed are not the most important criteria. One must determine how much of the food made available through such programmes goes to the "at risk" groups. A school feeding programme, for example, may reach large numbers of children, but not those likely to be malnourished. The objective should be to maximise nutritional gains per unit of expenditure. While this cannot be done with mathematical precision, it is possible to rank alternative strategies on the basis of their relative effectiveness in reaching target groups.

NUTRITION AND SOCIO-CULTURAL FACTORS

by
Diva Sanjur

In assessing the nutritional status of population groups, and particularly of a young population, the crucial need to identify environmental and family factors has long been recognised. The family environment represents one of the most closely associated sets of factors influencing the nutritional status of the child. Diet is one factor of particular importance to the nutritional condition of young children. Expressed in an epidemiological framework, the agent is the diet required by the child, the environment is the family, the community and the ecology, and the host is the child itself.

Figure 1. Ecological-familial factors in nutritional status



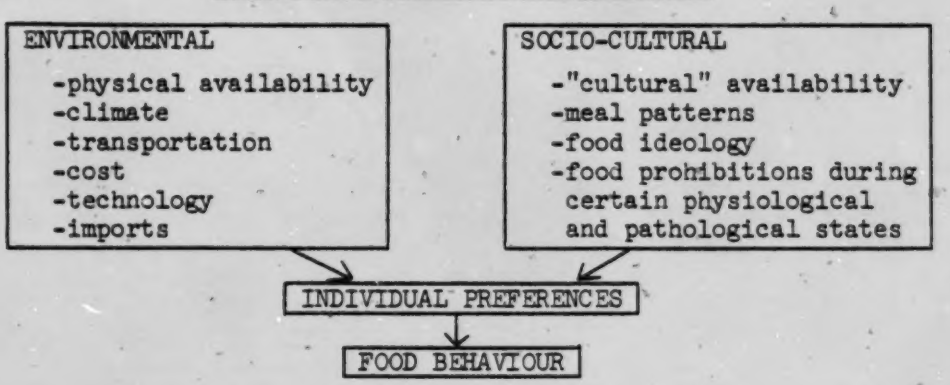
Both the disciplines of nutrition and economics have offered methods for gaining knowledge concerning what foods people eat, in what quantities, as well as when, where and why. In nutrition research the conventional source of information is often a dietary survey as part of a nutrition status survey, or a food consumption survey per se. In the field of economics, budgetary studies afford similar data. Within the household budget survey, food purchasing data are generally obtained.

Food purchasing, a close indicator of non-farm household consumption, is largely determined by income. Owens has shown that there is a relatively high incidence of sub-clinical malnutrition among preschool children in families with the lowest purchasing power. Thus, it appears that poor income or low purchasing power is a strong determinant of malnutrition risk among preschoolers.

The relationship between income and food consumption was recognised as long ago as 1857, when Engel observed what was to become his famous law: that the percentage of income spent on food declines as income increases. This relationship has since been verified in hundreds of budget studies. However, poor income is neither a necessary nor a sufficient precondition for malnutrition, as there are nutritionally healthy children among the poor and cases of malnutrition from families with more than an adequate income. Furthermore, it has been shown also that raising incomes does not always guarantee improvements in nutrition, and that improvements in nutritional status are possible without raising income significantly.

Thus, we will describe here other dimensions, besides income, which have not been fully recognised or explored in national nutrition planning and policy making: these are the socio-cultural factors which have a considerable influence in shaping food behaviour. It is extremely important that nutritionists and others concerned with food issues recognise and understand the major forces, both physical and socio-cultural, governing food habits, before changes or modifications are suggested to improve them.

Figure 2. Variables affecting food behaviour



Lenin perhaps first identified the fact that values influ motivation to eat or not to eat particular foods. He delineat frames of reference which may be used by the individual when e foods. These are:

1. Taste: The culture affects habits and determines to a great extent which foods taste "good" and which do not

2. Health: The rationale behind the judgement of which f are healthful and which are harmful may be scientific knowledge, non-scientific belief or just experience.

3. Cost: The cost of a food may help determine whether o not it is purchased and, if it is, how it is used.

4. Status: Considerations of status are related to expen since prestige foods are usually more expensive than low-status foods.

These values interact with each other to create food habi are deeply enmeshed in the environmental, social and cultural of a group of people. For this reason we view these values as vening factors affecting the formation and development of food

Recent studies have also shown that, in addition to incom factors as parental education, cultural and ethnic background, size and composition, occupation, and exposure to different fo communication may also have a strong effect upon food purchasi consumption. Identification and analysis of the impact of suc on food purchasing and consumption will furnish an understandi the mechanisms underlying food behaviour. And these factors m taken into account if policy making and nutrition education ar based on the real-life situation of the population groups invo

Dietary Methodology

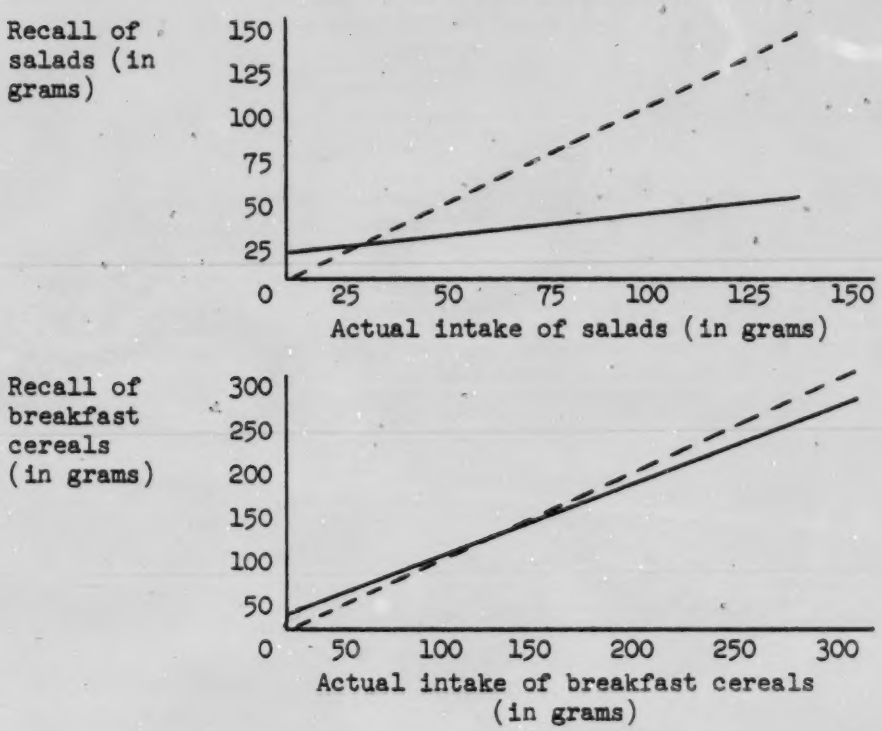
In evaluating the nutritional status of a population, var parameters must be coordinated, such as chemical, biochemical anthropometric tests. Some assurance is also needed that at e level the indicators have been periodically assessed for their of validity. In this regard, several researchers have agreed remarkable unreliability of data from dietary surveys has been concerting.

The 24-hour Recall Method: Nutritionists most often rely on t hour recall method to indicate the immediate past food intake population group. It is a quick, inexpensive, convenient and accurate way to estimate food consumption. The most crucial d tage, however, is the limitation of memory, whatever the purpo the study may be. Human interviewing errors also have an impo effect on the validity of this technique, as well as the limit period under study. Often communication problems may result i curate recall: the respondent fails to mention a food because

the interviewer may not be familiar with it or because it is such a common part of the diet that he feels it is unnecessary to mention it. Other shortcomings are the inability of some respondents to identify different kinds of food or to estimate correctly the amounts of foods consumed.

Figure 3 illustrates data from a recent study which was undertaken at the Cornell University Medical Center, at New York Hospital. The purpose of the study was to test the validity of the 24-hour recall method as a dietary survey tool. The pattern of association between the actual and the recall food intake was calculated for fourteen food groups. The linear regression showed that in all food groups the fitted regressions fell above the origin when x = 0 and that they had slopes ranging from 0.24 for salads to 0.89 for breakfast cereals.

Figure 3. Fitted linear regressions between actual and recalled food intake

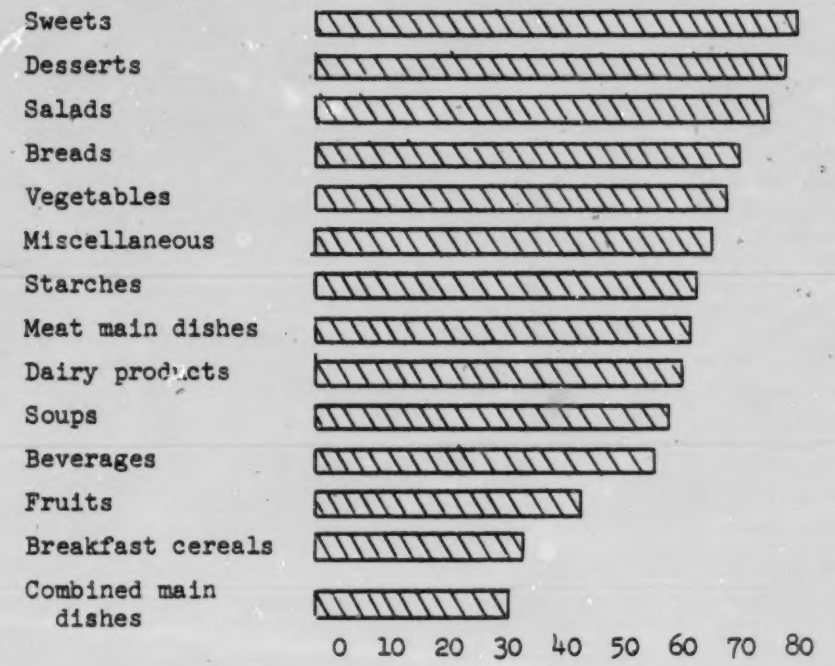


The data in Figure 4 also show the overall tendency of the respondents to underestimate their actual consumption of certain food groups, in this case those groups of high caloric content. Yet, in spite of methodological limitations, the 24-hour recall method may continue to be the most practical and useful survey tool for assessing the dietary intake of specific population groups. The growing trends of modernisation, accompanied by changes in life styles, in food purchasing

practices, and resistance to intruders doing "research", constitute barriers to the use of more accurate, but elaborate and time-consuming food weighing techniques at the household level.

In determining the choice of food survey methods, it is crucial first to formulate a clear definition of the objectives of the study. If quantitative dietary information is needed (as in the case of food balance studies or some epidemiological studies), then the choice of methods is clear because the direct weighing of food is practically the only technique which provides an accurate estimate of quantities. On the other hand, if the purpose is to ascertain trends in dietary patterns for sizeable population groups (possibly to serve as baseline data for applied nutrition and public health programmes), then the 24-hour recall method would be a valid choice.

Figure 4. Actual percentage of underestimation of quantity of food



In summary, the study described here and others reported in the literature raise critical questions concerning the validity of the 24-hour recall method in ascertaining the quantity of food consumed. On the other hand, there seems to be considerable agreement among investigators regarding its usefulness in determining qualitative aspects of diet.

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NUTRITION EDUCATION: IMPLICATIONS FOR NUTRITION PLANNING AND POLICY MAKING

by
Diva Sanjur

Nutrition education can be defined as the process of acquainting people with the value of resources already available to them and persuading them to change existing practices. Berg contends that nutrition education deserves careful consideration as an element in an overall nutrition strategy. Unfortunately, this field has not always received the attention it deserves.

Numerous studies in different parts of the world have revealed a number of characteristics of families in underdeveloped areas which are held to be the causes of malnutrition. Some of these characteristics are large family size, high birth rate, low level of education, minimal contact with contemporary knowledge and strong attachment to the traditional way of life.

In 1971, Jelliffe coined the term "commerciogenic malnutrition" to describe the incidence of malnutrition in developing countries which can be ascribed primarily to the use of commercial milk preparations which poor families cannot really afford. The presence of this type of malnutrition clearly indicates the importance of nutrition education within any nutrition planning scheme.

Berg suggests that four basic questions be raised when planning nutrition education programmes (See Berg, Chapter 6, pp. 74-88):

1. How successful will the programme be, given constraints of income, ecology and local supplies?

2. How long will it take? Will it be months, years or generations before the objectives are achieved?

3. What are the costs of nutrition education efforts, as compared with the costs of alternative means of achieving the same nutritional objectives? We need to consider the cost over time of bringing about an actual change in food practice.

4. What are the other costs of change in food behaviour? The psychological or aesthetic cost may be high, although not measurable in economic terms. Special food practices are among the few satisfactions available to people living in poverty.

It has been emphasized through this seminar that a better understanding of what people eat (dietary surveys) and why they eat the way they do (socio-cultural factors) is an imperative preamble to any nutrition education programme. Understanding traditional food habits and the forces behind them is a key element to the success of any nutrition intervention or education strategy. This is particularly

critical in African countries where numerous regional variations exist. Where nutritional inadequacies exist, dietary modifications, rather than major changes in food habits, are the most feasible means of achieving the nutrition educator's goal, the ability and desire of individuals to make wise food choices, and the development planner's goal, the improvement of the quality of human life.

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SOME NUTRITIONAL FACTORS IN AGRICULTURAL DEVELOPMENT PLANNING

by
T. Bryan Morgan

Development of the agricultural sector has long been regarded as a significant aspect of overall economic development, and many have considered the crucial role of agriculture in providing food for man as secondary to the pursuit of economic goals. Economic planners have given consideration to nutrition only in terms of very general aims, such as the provision of adequate food supplies combined with attempts to control population increase. Those nutrition intervention activities which were pursued by developing countries, often with international, bilateral or voluntary agency support, were largely such programmes as food distribution to the needy, changing food habits through nutrition education and formulating protein-rich foods for infant feeding programmes. These programmes tended not to be integrated into overall national development planning.

The fact that malnutrition and undernutrition are increasing throughout the world in gross terms, rather than decreasing, is evidence in itself that past development planning and nutrition intervention programmes have failed. The ultimate goal of effective nutrition planning is the elimination of undernutrition, i.e. the provision of optimal intakes of energy and nutrients for all people everywhere. (The term undernutrition also includes malnutrition, save for certain digestive, metabolic or diseased states, hunger and starvation.) For the purposes of this seminar we can ignore the problems of overnutrition.

The attainment of this goal involves two fundamental factors. First, production and distribution must be improved so that foods are available which provide the minimal energy and nutrient requirements of the population. Second, the foods must be acceptable to the consumers, and the poorest members of society must be able to afford sufficient food supplies to meet their minimal requirements.

I regard it as axiomatic that one goal of agricultural development planning should be the production of all, or the principal portion, of a country's staple foods and any other food commodities on which it is becoming increasingly dependent. It is only in rare exceptional cases that I would depart from this view. Developing nations cannot afford to risk nutritional hazards and shortcomings brought about by fluctuations in world market prices for their basic food needs.

The problem of increasing the purchasing power of low-income population groups so that they can meet their basic nutrition requirements has increasingly engaged the attention of nutritionists in recent years. Studies undertaken in developing countries during the past five years (India, Madagascar, Brazil, Tunisia) have shown that a significant proportion of the population is unable to purchase enough of the right kinds of foods to ensure nutritional well-being. These results confirm the findings of Boyd-Orr in Britain over forty years ago which led to a welfare programme for feeding the poorest members of the population. People whose incomes are in the lowest twenty percent are frequently said to be at special nutritional risk, but a close examination of recent surveys indicates that often up to fifty percent of the population cannot afford an adequate diet. Household income and expenditure surveys must always accompany food consumption studies, and better methods must be found to identify individual families at risk.

A number of measures were discussed to raise the food purchasing power of the poorest members of the population, such as redistribution of income, land or other resources, greater taxation of the higher income groups and control of the "middle men" in the food marketing system. These measures should not necessarily carry any strong ideological connotations because they are practiced in countries of every political persuasion.

It must be stressed that measures to promote income redistribution do not necessarily result in nutritional improvements unless they are accompanied by some form of nutritional intervention. Nutrition education is probably an essential component, and other intervention activities, such as the introduction of a low-cost weaning food prepared from local ingredients or the establishment of low-cost food shops, must always be considered, taking into account the social, cultural and economic constraints which may be involved.

THE NEED FOR TRAINED NUTRITION PERSONNEL IN THE FORMULATION OF NUTRITION PLANS AND IN THEIR IMPLEMENTATION

by
T. Bryan Morgan

Although in the past few years there has been increased recognition of the importance of national nutrition planning, to my mind sufficient attention has not yet been given to the critical importance of:

(a) trained nutrition personnel at various levels who participate in the many stages involved in the formulation of nutrition plans and policies, and

(b) appropriately orientated planning personnel from other disciplines.

Fifteen years ago the number of nutrition scientists from English-speaking African countries was extremely limited. Photographs of participants at nutrition seminars held in the 1950s (e.g., Gambia in 1953 and Kampala in 1957) bear testimony to the shortage of African personnel. The number of African nutritionists at this seminar is evidence in itself that the situation has improved.

Since 1960 a number of African nutritionists have been trained, and much of the credit for this is due to FAO, WHO and UNICEF. In 1961, these organisations launched jointly the African Training Programme in Nutrition and in Extension in Relation to Improved Nutrition. The regional and national seminars which were organised in the early 1960s undoubtedly increased the awareness of the countries involved of their nutrition problems, and the fellowships awarded as part of the Programme allowed many Africans to undertake degree studies in nutrition. In Kenya, four nutritionists, who now occupy important positions in government, education and commerce, were helped in this way with their training.

But perhaps more importantly, the Programme led to the establishment of high-level nutrition training facilities in Africa. This has been accomplished at the University of Ibadan in Nigeria where, after some years of liaison with the University of London, nutrition courses at certificate, degree and post-graduate levels are now being organised. It is hoped that Makerere University in Uganda and planned training facilities in Tanzania will be able to provide nutrition personnel for East African countries in the near future. Unfortunately, the course in Food Science, Biochemistry and Nutrition given at the University of Legon in Ghana has reduced the nutrition component to such an extent that graduates evidently find themselves ill-equipped to work in public health nutrition programmes. On the other hand, nutrition courses are being incorporated into many college-level institutions, such as Egerton College in Kenya, and it is hoped that information on nutrition will be incorporated into all training courses which relate in any way to the various stages of the food chain.

Commendable though these efforts are, there are still probably not enough trained nutritionists in African countries to carry out effective nutrition planning and implementation. It is extremely important that nutritionists participate in the formulation of national development plans, along with economists and other specialists, and trained nutrition workers are also needed in order to put the programmes and strategies devised at the national level into action. In spite of these considerations, it appears that international agencies are presently reducing their support to nutrition training institutions in Africa and are also reducing the number of fellowships granted for training in nutrition.

The need for trained nutritionists and other personnel with some orientation in nutrition depends in each country on the population, the nature and magnitude of the nutrition problems and the number of workers already trained. It would be unrealistic to make any manpower projections based on population alone, given the great disparities in the populations of countries represented at this seminar, e.g., Gambia with 494,000, Liberia with 1,016,000, or Nigeria with 55,670,000 (U.N. Statistical Yearbook 1973). For example, if we decided that there should be one trained nutritionist for every 200,000 population, then Gambia would need 3 nutritionists, Liberia would need 5, and Nigeria 122. This might be a realistic goal for Gambia and Liberia over the next few years, but certainly not for Nigeria.

If nutrition planning is to become more than an academic abstraction, then projections must be made of manpower needs at various levels and a training strategy must be included as part of the planning exercise.

NUTRITION AND THE DEVELOPMENT PROCESS

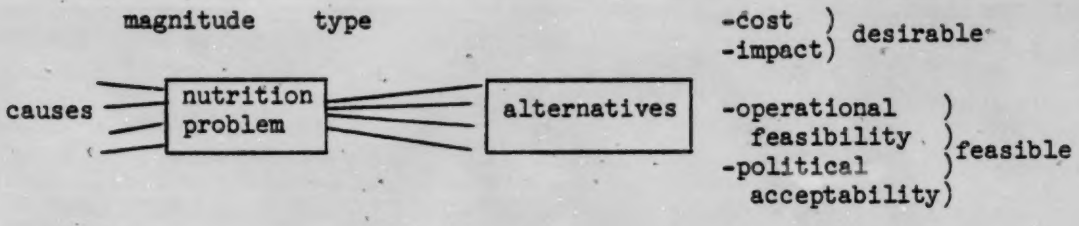
by
Claudio Schuftan

The effects of malnutrition are reduced physical growth, which may not be of great concern, stunted mental development, which is of crucial importance to the individual and society, and economic consequences, such as lowered productivity and the diversion of economic resources to programmes for the malnourished. Further, investments in such areas as education and health may not achieve their full impact with population groups which are suffering from malnutrition.

A society can perpetuate a syndrome of poverty and underdevelopment which ultimately affects all members of the population, rich and poor alike. Underdevelopment leads to malnutrition, which leads to physical and mental disabilities, which lead to lowered productivity, which leads back to underdevelopment in a vicious circle. Because malnutrition is part of the wider problem of poverty, each narrowly focussed programme can only have a small impact: we need an ideological perspective to attack the broader problem. And this will not be achieved easily. A study in Colombia revealed that in order to provide the low-income groups with a minimum adequate diet, the upper-income

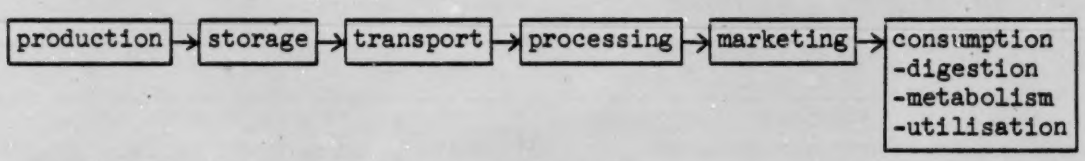
groups would have to give up to 21.3 percent of their income for redistribution. Will they do this? Graham Greene wrote in The Honorary Consul, "Malnutrition is much safer for the rich than starvation, the latter makes a man desperate--the former makes him too tired to raise a fist."

Nutritionists and others devoted to promoting nutritional goals must take part in the planning, the implementation and the evaluation of development programmes. It must be remembered that economic growth, as evidenced by increases in G.N.P. or per capita income, is different from economic development, which should include better health, nutrition, education, employment, and agricultural production. Nutrition programmes represent an investment in human capital. They must compete with other development programmes for scarce funding, and nutritionists must advocate their programmes by presenting information to high-level government officials, pressure groups, technical staff and government administrators. One approach to the presentation of data can be represented schematically as follows:



Alternative Solutions

The nutritional status of the population is determined by a chain of factors, each of which may be addressed in order to bring about nutritional improvement. This chain can be depicted as follows:



Agricultural Interventions

The first possible set of interventions relates to food production. The nutritional effects of agricultural policy alternatives must be considered, for example when deciding whether to concentrate on energy-intensive, high-technology or labour-intensive, intermediate-technology production, whether to stress animal draught or machine mechanisation, whether to bring new lands into cultivation, and policies relating to inputs, credit and land tenure.

It has been found that inequitable land tenure systems are generally characterised by low levels of production. Land redistribution

may be called for, even though it must be expected that production will decline in the first few years. If stress is put on maximising food production to keep up with growing populations, the question of land tenure becomes secondary.

Nutritional consequences must be considered when planners decide whether to stress food crops, cash crops or animal husbandry, or whether to place more emphasis on rural development as a whole, including the development of cooperatives and small industry.

Managerial Interventions

Under this heading come activities aimed at bringing about changes in the food marketing system, in the storage and transportation of food and in the role of intermediaries or "middle men".

Food Technology Interventions

This type of intervention might involve the development or introduction of new foods such as non-conventional protein sources or infant weaning foods. Programmes of food fortification or improved preservation might also be considered. Stress can be placed on food processing technology at the village level or at the central level. Finally, priorities must be set for future research, which should probably include more applied research and more analysis of the basic foods in developing countries which have been neglected in the past.

Educational Interventions

If nutrition education is to be stressed, which ministry should be responsible? Perhaps agricultural education or consumer education programmes are also needed, or perhaps emphasis should simply be placed on raising the level of general literacy. If the mass media are to be used, careful attention must be given to the content of the message which is delivered. If there is a shortage of trained personnel in the field of nutrition, then plans for increased manpower training must also be considered.

Environmental Interventions

Changes in the environment which lead to improved health will also raise the nutritional status of the population. Many programmes in this area can be carried out on a local self-help basis, such as improved water supplies and sewerage and the control of parasites and disease-carrying insects. Vaccination programmes for such diseases as measles are also important.

Community Organisation as an Intervention

Interventions in the process of development have generally been carried out from above, and for this reason they have often not been successful. Communities must be assisted to identify their own felt needs, and to transform these into effective demands and expectations.

At the beginning, small, feasible tasks should be carried out. Students can be mobilised to help organise the local communities.

Economic Interventions

The nutritional status of the population is influenced by the whole range of economic activities carried out by the government. For example, price policies have a tremendous impact on nutrition, as do import-export policies, including restrictions and taxes. Food distribution programmes obviously have a direct impact, and extremely important questions must be answered such as what food is distributed, and to whom. Governments can also choose to encourage investment in the agricultural or the industrial sectors with a range of incentives and subsidies. All of these policies should be considered from the point of view of nutrition.

One area of particular concern is the possibility for income redistribution. Feeding programmes which are supported by taxation are an example of one form of income redistribution. The transfer of wealth can become a more explicit goal, pursued by such measures as differential taxation and land reform. Choices of levels of technology also have income distribution consequences.

Health Related Interventions

The health investment strategy of a country should be scrutinised to determine whether the welfare of the poorest is being improved as much as possible. For example, it makes more sense to invest in small clinics in the rural areas than in one mammoth hospital in the capital city. Maternal and child health programmes and family planning, which makes child spacing possible, are important contributions to family health.

Political Interventions

This is a delicate subject. Nutrition planners and others involved in national development must ask themselves if it is necessary to settle for the status quo or to try to bring about a revolution. Is there a middle way of evolution towards a society where the primary goal is the welfare of all? It is certainly possible to improve the nutritional status of the population to a significant degree, even within an inequitable political and economic system.

ORGANISATIONAL BEHAVIOUR: AN OUTLINE

by
Robert L. Adams

Definition: "Organisations are social units deliberately constructed and reconstructed to seek specific goals."

Organisations are characterised by:

1. Planned divisions of labour, power and communications;
2. One or more power centres which cont[illegible] organisational

efforts, direct them toward goals, and review progress; and
3. Substitution of personnel (firing, transfer, promotion, etc.).

Goals

Organisations normally pursue certain goals. These goals represent a future state of affairs. Goals are not always clearly stated or fully understood within an organisation. We must differentiate between at least three different sets of goals:

1. The goals as members of the organisations think they are;
2. The goals as members of the organization think they ought to be; and
3. The real goals, as determined by:
   a. the division of labour, and
   b. the flow of work, and
   c. the allocation of resources.

Exercise

Considering your own organisation, what do you think its goals are, what do you think its goals ought to be, and what are its real goals? This can be done in a very simple, general manner. However, when you have returned to your office, consult your budget, your list of employees and their responsibilities, their work schedules and other relevant documents. On the basis of these, do the goals of your office become clearer, more specific?

Apply this same basic test to your own professional activities. If an outsider were to closely observe you and your work, what would she or he think were your real goals?

Goal Displacement

Goal displacement simply means that the original or public goals of an organisation are displaced by other goals, sometimes hidden, sometimes unrecognised, sometimes obvious to everyone but members of the organisation.

Some Types of Goal Displacement

1. The means become the ends and the ends become the means. This frequently occurs at the upper levels of an organisation. For some people, the maintenance of the organisation becomes more important than its goals. This is not always easy to avoid. Sometimes a great deal of effort is expended in finding the financial resources to support a programme. The ends (goal) become the means (justification) for receiving financial support. This can consume so much time and energy that the attainment of the financial support becomes one of the major goals itself.

2. At the middle and lower levels of some organisations (usually those we refer to as "bureaucracies"), there often develops a rigid adherence to rules and regulations that limits flexibility and may become a goal itself. "Going by the rule book" can be an indication of insecurity on the part of some employees who fear that any deviation from the regulations will only endanger their professional position.

3. Another form of goal displacement is "internal fixation", which can and does occur at any level within the organisation. This represents a preoccupation with the problems of the internal management of an organisation. Examples include: Continual meetings to discuss a reform of the filing system; frequent rewriting of job descriptions without a significant change in operational capabilities; or regular "re-organisations" that only change superficial aspects without making any real changes in goals or efforts toward goals.

4. Goal achievement can be over-measured to the detriment of the goals. As an example, if the official goal is to reduce protein deficiency and the measure of achievement is the number of protein supplements issued, supplements may be issued inappropriately (which raises the number distributed and thus appears to be a major achievement) while, in actual fact, protein deficiency may be increasing, remaining unaffected, or declining too slowly (inefficiently). The goal ceases to be reduction of protein deficiency and becomes distribution of supplements. This often leads to what is called the "numbers game".

Exercise

Can you think of examples of goal displacement in your own organisation? Again, this ties in with the definition of your organisation's real goals. Can you think of ways in which original goals can be "replaced" to counter the effects of displacement. Thinking of the examples cited in the discussion, do you remember instances when you yourself allowed a valid goal to be displaced by something else? What were the reasons for your decision? Could the situation have been handled differently while retaining the original goal?

Many of us work for multi-purpose or multi-goal organisations. Generally, multi-goal organisations are thought to be preferable because:

1. They improve service by mixing people of different backgrounds (the "collegial effect");
2. Such organisations may have more appeal/prestige and draw higher quality personnel;
3. Some good workers prefer a multi-goal approach; and
4. It is felt that several disciplines working together may have a greater total impact than they would if they were acting separately and independently (synergism).

However, multi-goal organisations may also face certain problems:

1. There may be serious conflict over the division of means, time and energy;
2. Personnel may be under considerable strain attempting to deal with many different approaches, demands, requirements;
3. Some good workers prefer to concentrate on a single goal; and
4. There is the danger that one particular goal will predominate to the detriment of the others.

Attitudes toward Clients

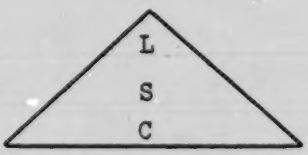
Sometimes employees are too "organisation-oriented" or "job-oriented" and not sufficiently client-oriented. We all represent organisations whose ultimate goal is to provide services for the general public or portions of the general public. If we are to be successful "servants", we must be sensitive to the needs and concerns of our clientele. Organisations have dealt with this need in several ways, including:

1. Co-optation--This may involve co-opting some of the clients on to committees, advisory boards, etc. to represent client interests in programming and planning. Much talked about in some circles, this approach has not been as widely utilised as it might appear. Among others two basic problems are noted: (a) selection of those to be co-opted and (b) a wide-spread belief that clients have nothing to really offer as they have no training.

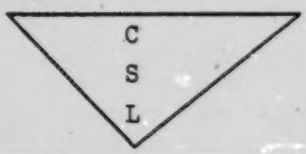
2. Changing client expectations--This can be done publicly--"Contrary to popular opinion, our organisation does not deal with A, B, and C. We are strictly concerned with X, Y, and Z." More frequently, it is a hidden process. Publicly clients are told they will receive certain specific services. In practice, however, they find a different situation, and eventually expectations are changed to fit reality rather than public pronouncements. This is not an especially satisfactory means of dealing with clients, but that does not deny its prevalence.

The Traditional and the Inverted Pyramid

The traditional pyramid shape can be used to represent the division of authority and the flow of information and work from the leadership to field staff and to the clients. In simplest form, it would look like this: (L = Leadership; S = Staff; C = Clients)



When discussing the means of dealing effectively with the concerns and complaints of clients, it may be of some help to invert the pyramid:



Within the traditional pyramid, we are probably quite cap specifying the formal linkages between different levels. With inverted pyramid, however, we may find ourselves hard-pressed scribe the process by which information reaches the leadership even the staff. Most organisations do not have a formal means munication which operates regularly and successfully to deal w set of circumstances. How can we improve communications for t verted pyramid?

Exercise

Make a traditional pyramid for your organisation. Invert pyramid and look at the situation from the point of view of in tion coming from the clients. Ask yourself these questions:

1. Do we have a formal mechanism for handling client complaint suggestions? If so, does it work?

2. Are our staff trained in dealing with complaints and suggest Are they questioned if they bring no complaints or suggesti our attention over a period of time? In other words, what staff think we expect from them in this line?

3. Does our official reporting include reports on failures, co suggestions, etc. as well as positive results? Do the job tions of our employees include statements concerning their of complaints, etc.?

4. Could co-optation be given a try? Do we change client expe by our treatment of them? In what way? Does the reality o presentation to clients conflict with our official public p ments? Have we learned to simply accept this unfortunate s and given it little or no priority?

5. Having considered the clients, ask the above questions agai this time think in terms of different levels within the sta are the lines of communication in the inverted pyramid betw and leadership? How are staff complaints handled?

THE PLANNING PROCESS

by
James Pines

The development process must start with and be controlled people themselves. At the same time, a well ordered technical is required to serve this process.

The technician has no right to decide what the objectives of a developing country should be. Rather, his role is to assist in the analysis of possible alternatives suggested to achieve proposed goals and objectives. Development has two aspects, an ethical one and an analytical one. It is important to keep in mind that planning techniques are part of the analytical side of development, and not the philosophical side.

The nutrition planning process has eight steps, but it is not a mechanical, step-by-step approach. Instead, it is a way of thinking about our work, not a controversy over definitions.

The method of systems analysis is a way of applying common sense. It uses two concepts which can serve as an introduction to the planning process:

1. The concept of interdependence, which suggests that there is not one, simple cause for the problem of malnutrition. Rather, it is due to a group of interrelated factors; and

2. The importance of quantification, which can be utilised in the solution of many problems. It is critical in the comparison of alternatives and in evaluation.

Above all, it is important to note that the planning process is not a mechanical one. It is iterative: we move back and forth between the steps; we work in several stages at the same time, and we are constantly modifying our actions.

Pre-planning Stage--Political Acceptance

While political acceptance of the importance of nutrition is regularly assumed, it often does not really exist. The first step, before planning, is to promote enough interest to assure that nutrition is given a certain priority in the programmes of government or private institutions. One approach is to present significant data, but this is not sufficient. There will always be a political struggle regarding the establishment of priorities.

Step 1--Identification of the Problem: One must begin by identifying the exact nature of the nutritional problem. A good starting point is to gather and analyse already-existing studies, as well as look for other, indirect methods of approaching the problem. An analysis of this type of preliminary data can provide a general outline of the nutritional status of a country or region. Even if the margin of error is 10 to 20 percent it may still not be significant due to the gravity of the situation. New data can be collected and interpreted during programme implementation to correct and refine the initial description of the problem.

Six points should be considered in the description of nutritional status:

1. Who are the malnourished?
2. Where are they located?
3. What kind of malnutrition do they suffer from?
4. What is the degree of malnutrition?
5. Are there seasonal variations?
6. What is its duration? Acute? Chronic?

The description of the nutritional status, which results from answering these questions, must be placed within a dynamic framework. That is, we must project to the future, and ask: what will happen in three to five years if we make no changes in the present situation? What corrective actions can we initiate now?

Finally, our description must break down statistics which represent national averages, because these statistics disguise the truth. We need to know how nutrients are distributed, and not only the total amount available in a given country.

Step 2--Determinants (Etiology): After describing the nutritional problem, we must diagnose it to discover its determinants, i.e., a series of interrelated factors specific to the situation under study. These factors are directly related to the principle subsystems of the nutrition process:

1. The subsystem of consumption which has two aspects: intake itself, and the actual utilisation of the nutrients consumed. Utilisation refers to the process by which ingested nutrients pass through a process of digestion, absorption and metabolism.

2. The subsystem of production, where a comparison can be made between the quantity of nutrients produced in a country and the amount required by the population.

3. The subsystem of distribution, which includes warehousing, marketing, processing and packaging.

From this, it can be seen that there is a flow of nutrients which are created in production and pass through the stages of distribution and consumption, where they are converted into energy which, once again, contributes to production, etc. The process is a cycle of energy, but an imperfect one, in which losses can occur. Therefore, one has to trace nutritional consequences throughout the whole system, identifying significant relationships. There are several tools which can help in this analysis:

1. The food balance sheet, which establishes an interrelationship between food availability and food requirements. If the net availability is greater than the total amount required, it can be deduced that production problems are not critical. It does not follow, however, that malnutrition does not exist. On the other hand, when need exceeds availability, it is an indication that production problems are significant.

2. The minimum cost diet, and its relation to income level. This indicates the lowest possible expenditure required to purchase an adequate diet, and provides reliable data on the number of families which do not have the financial means to achieve good nutrition. In order to be a useful planning tool, the data it provides must be projected to the future: How many families will be able to purchase their food requirements within three years?

3. Ecological zone or profile, which identifies clusters of communities with similar nutritional patterns.

4. The concept of the marketing chain, which enables us to identify the points in the distribution process at which foods acquire excessive costs.

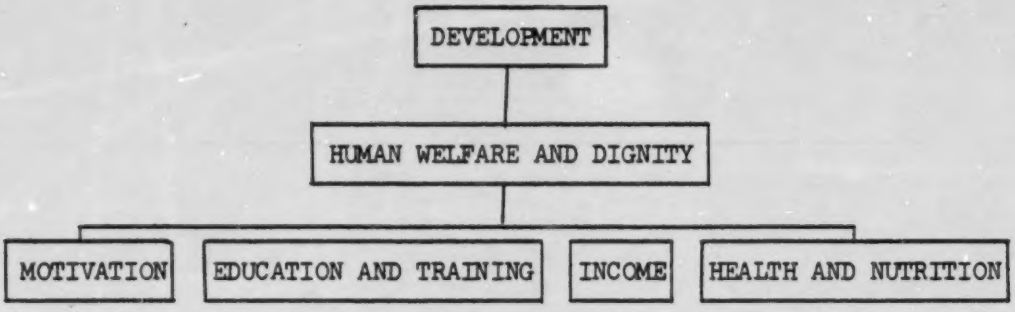
5. A study of the causes of child mortality.

Step 3--Identification of Resources and Limitations: Who are we and what can we do? What are our actual and potential resources. We must plan our resources as we plan our development programme, but we must not simply settle for programmes for which resources are available, which might be called following the money. The temptation to think only of resources without clear objectives in mind should be avoided.

Our constraints have a time dimension, and by long-term planning we can help eliminate some constraints such as lack of trained manpower, or inadequate transportation. We must think imaginatively in order not to do the same thing year after year. Our limitations include physical, financial, environmental and cultural constraints, as well as self-imposed restrictions.

Step 4--Identification of Priorities and Provisionally Desired Changes: In development work, we seek to effect certain desired changes. During planning, these changes can only be identified provisionally at first. Later on in project formulation, they can be quantified. Since one institution cannot effect all the changes it would like, it must identify priorities among them. The decision to select certain priorities over others is a political one, and each institution has its own process of making these decisions. A technician can only indicate the consequences which would result from implementing various alternatives.

A priority can have many dimensions: It can identify target group, geographical sector, degree or type of malnutrition. It can represent a balance between treating current malnutrition and preventing its incidence in the future. There can be more than one priority in a programme, but each one must be identified clearly. Further, nutritional priorities can be made to fit with other development objectives, although this depends on one's definition of development. It might include the following elements:



These different elements are interrelated. All are means and ends at the same time.

Step 5--Identification of Actions and Comparison of Alternatives: What is the most effective alternative? To answer this question, one must analyse the data to identify promising points of intervention which are directly related to the determinants of the problem. This process of identification is an art, not a science, and depends upon one's ability to recognise significant relationships in the data one has collected.

Once the point (or points) of intervention have been identified, alternative actions to correct the faults in the system can be proposed and compared. The comparison should be based on a careful analysis of costs, political conditions, priorities and probable results. The concept of cost per person changed must be used, and not cost per person reached.

Step 6--Strategy and Programmatic Hypothesis: A strategy can be described as a series of related projects designed to effect a significant change. Each project, which forms part of a strategy, contains a programmatic hypothesis which, in a general way, states that if we work with a certain group in a certain environment, doing certain activities, we will arrive at a certain change (results). A project is considered an hypothesis because we cannot assure the results beforehand. Rather, it must be tested during implementation and verified by evaluation.

In order to effect a significant change, we must programme a series of intermediate changes, which can be achieved by individual projects. For example, the formulation of base communities can be an important intermediate step towards nutritional change.

In most projects, we work with two groups of people, the target group and the intermediate group, that is, the one we work with to effect changes in the target population. The characteristics and conditions of each group must be known, since they will influence the form of the project, and its possible results. Some characteristics are level of literacy, urban or rural residence, culture, income, occupation, age and family size.

Looking at the chain of intermediate changes which must take place in, for instance, a nutrition education programme we find the participants must:

1. Attend the programme and learn the material being taught,
2. Change their attitude,
3. Change their behaviour the first time, and
4. Change their behaviour permanently.

Our success in effecting change at any of these levels will depend on the type of activity undertaken and its appropriateness to the characteristics and conditions of the target and intermediate groups. If evaluation indicates that the desired change has not occurred, we can change the variables; that is:

1. Reduce the level of desired results,
2. Modify the activities, or
3. Change the group.

Step 7--Mobilisation of Resources and Implementation of Activities: When planning, one must consider the difficulties which might arise during project execution. One must also consider current weaknesses, often institutional ones, which can affect the achievement of results. Activities must be planned and undertaken to correct these weaknesses so they do not persist in the future.

Planning must be directly related to available resources and those which can be reasonably expected. A flexible contingency plan can also be devised in case more resources than projected are received, but planning must be as realistic as possible.

If resources are limited, it is best to use them intensively, rather than extend them across too many communities.

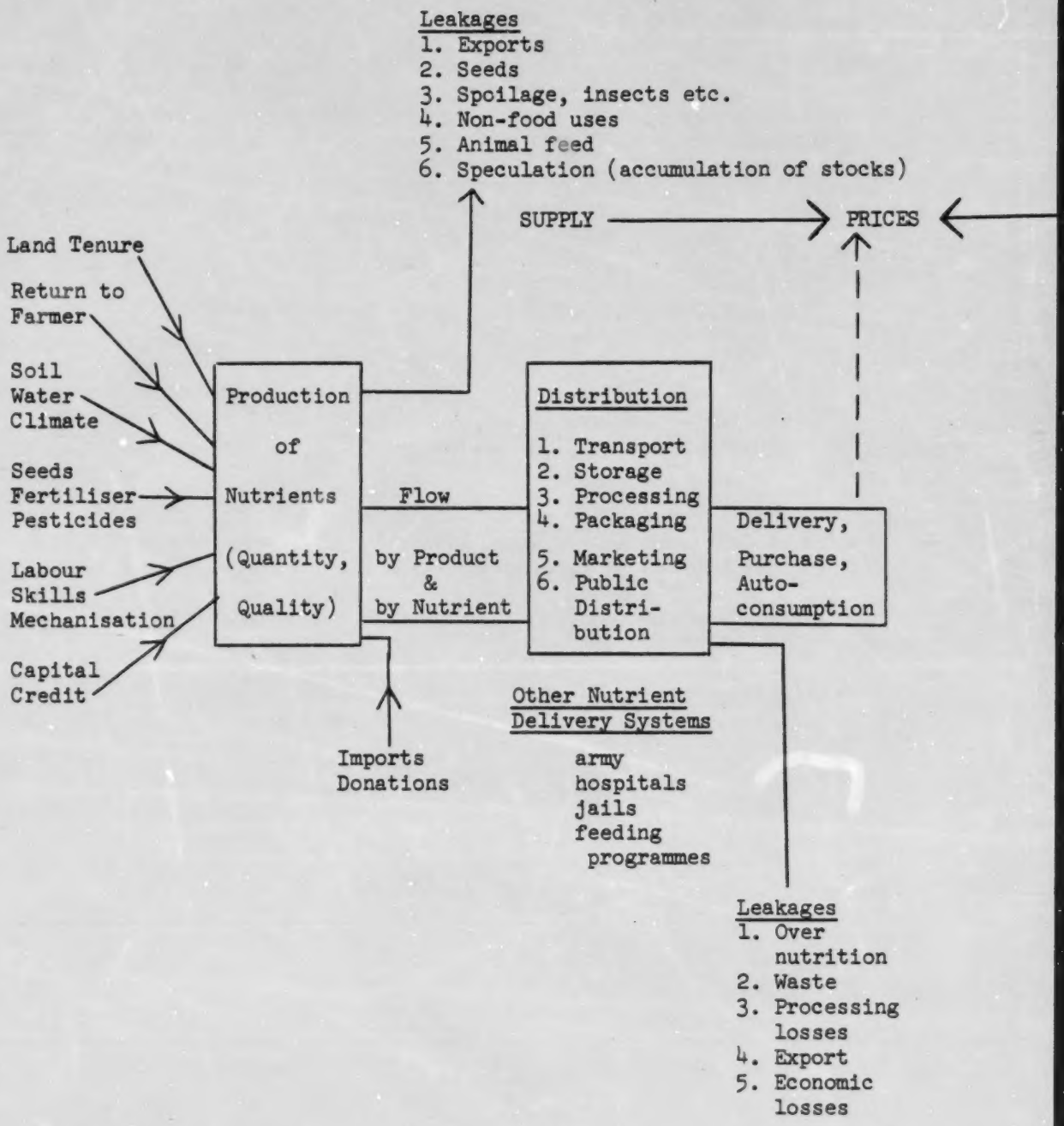
Step 8--Evaluation and Feedback: Evaluation is not research. It does not require scientific experiments. These can help, but they are not indispensable.

In evaluation, there always exists the problem of attribution. Did something happen because of you, or would it have happened without you? Did the project fail because of you, or for some other reason? The best way to answer these questions is by comparing the changes in the target group with a control group not included in the project. This type of experiment is often not possible under field conditions. Therefore, we use other techniques to determine attribution:

1. The temporal and physical proximity of activities to results guarantees a causal relationship. On the other hand, the further the consequences from the activities undertaken, the more extraneous factors will intervene.

2. The historical method: We arrive in a community where no significant changes have occurred in a long time, and we begin work. If changes occur, they can be attributed to our intervention.

NUTRITIONAL



AFFECT ALL

1. Administrative structure (and human systems)

2. Government policies and programmes

SYSTEM

(by Jim Pines)

THE GOAL
NUTRITION STATUS

Requirements, Allowances and

consumption, utilisation

Consumption	Utilisation
Purchase	Digestion
Preparation	Absorption
Intra-family distribution	Metabolisation
Weaning habits	
Breast feeding	
Meal patterns	
Seasonality	

Physical Consequences

1. Energy
2. Growth
3. Resistance (morbidity)
4. Mortality
5. Educability
6. Prevent Blindness
7. "Well-being"

Economic Consequences

1. Productivity
   absence
   capacity
   efficiency
   longer work life
2. Health costs
3. Education costs
4. Reduced family planning costs?
5. More real income (total and per capita)

(6. Political visibility)

1. Income
2. Cultural patterns
3. Family size, spacing, birth order, sex

1. Environment
2. Medical services
3. Habits
4. Combination & composition
5. Physiology

Demography

Health Sub-system

(This is not a complete schematic. It is intended to be illustrative of the system and shows some of the factors involved.)

Evaluation is an integral part of programming. Each project should include plans for evaluation, which answer the following questions:

1. Who will gather the data? What is their capability?
2. What are we planning to measure? We want to verify the programmatic hypothesis, tracing the change process.
3. How will we measure the change?
4. What are the indicators? (An indicator is an indirect, but concrete way to measure something that is often abstract.)
5. When do we evaluate? The time of evaluation must be related to the programmatic hypothesis. Sufficient time must be allowed to pass before change occurs.
6. What do we plan to do with the data? It is often better to have fewer data which can be thoroughly analysed.

Evaluation can, and should, form part of programmatic activities. Additional costs are often not necessary. Furthermore, for a sound evaluation, it is indispensable that all involved in a project understand well its goals and the programmatic hypothesis, and that indicators are not confused with the goal itself.

It is important to remember that we want to measure not only activities, but also results. Unfortunately, the most significant results take a long time to appear, but we must begin by measuring the first results in order to take corrective action, if necessary, before it is too late. As development is a continuous process, so also is evaluation.

Finally, evaluation should never be used to judge people, only concepts. And if there are errors in the concepts, we ought not to take punitive action against our employees.

HUMAN PROTEIN REQUIREMENTS

by
M. C. Nesheim

Proper estimates of a population's nutritional needs are essential components of food and nutrition planning. Such estimates are sometimes based upon uncertain data and involve an interpretation by expert committees. Recent estimates for population groups of requirements for energy and protein have been published by FAO/WHO (Energy and Protein Requirements, Report of a Joint FAO/WHO ad hoc Expert Committee, FAO Nutrition Meetings Report Series No. 52).

There is some controversy among nutritionists concerned with world malnutrition as to the importance of protein deficiency per se in human populations relative to a deficiency of total food energy. Some nutritionists have suggested that problems of protein deficiency have been overestimated. Protein deficits are also often accompanied by deficits of total energy. If many of the affected groups received

sufficient energy from presently available foods, protein intake would often be adequate. This simultaneous protein and energy deficiency is normally termed, protein-calorie malnutrition.

Such considerations of protein and energy needs are important aspects of agricultural planning. Should plant breeders focus attention on increasing protein content and quality of cereals and pulses or should total yield be the major goal of a plant breeding programme? Should schemes for development of new sources of protein be given priority in national programmes?

In the nutrition planning game, played at this workshop, the target of protein availability for a population was considered to be 29 g. per capita per day, which is based upon 1973 FAO/WHO recommendations. This represents a composite of requirements for various population groups, and is also based essentially upon "ideal" proteins such as are found in egg or milk protein. Since the amino acid composition of most food proteins varies from these ideal proteins, the utilisation of food proteins may not be expected to be completely efficient. Thus a correction factor must be applied to the requirement for protein which reflects the amino acid composition and expected utilisation of the food proteins actually consumed by a population. A figure of about 70 percent represents an average correction factor for protein utilisation. With this correction, the FAO per capita protein target becomes 41 g. per day.

Table 1 gives representative FAO safe protein intake data for various population groups both in terms of egg or milk protein and in terms of a protein mixture with an expected utilisation that is 70 percent of that of the "ideal" proteins.

Table 1. Safe protein intake for population groups

	Body wt. Kg.	Safe Levels "Ideal"	70% Utilisation
Infants 6-11 months	9.0	14	20
Children 4-6 years	20.2	20	29
Male adolescents 13-15 years	51.3	37	53
Female adolescents 13-15 years	49.9	31	45
Adult men	65	37	53
Adult women	55	29	41
Pregnant woman (last half of pregnancy)		add 9	add 13
Lactating woman (first 6 months)		add 17	add 24

Source: FAO/WHO, 1973

The data in this table show that requirements vary markedly among population groups. Planners must be concerned with distribution of protein resources among population groups as well as with general targets for the entire population.

Because of their more rapid rates of growth, children are particularly vulnerable to protein malnutrition. Similarly, pregnant and lactating women are considered vulnerable groups for protein deficiency since the protein needs of these women are elevated as proteins are synthesised by the fetus and by the mammary gland.

The effect of age on protein needs is better illustrated by Table 2 which expresses protein needs in terms of grams per kilogram of body weight for various age groups. The requirements are given in terms of milk or egg protein.

Table 2. Protein needs in terms of body weight

Age	g. protein/kg/day (males)
3-6 months	1.85
1 year	1.27
5 years	1.01
10 years	0.81
15 years	0.59
Adult	0.52

Source: FAO/WHO, 1973.

When resources are limited, planners and nutritionists have suggested that programmes of food supplementation be directed toward the more vulnerable groups. Such approaches are not always successful since social factors which affect the distribution of food within the family can interfere with such a strategy.

The human protein needs discussed here are based on present data, derived from studies with human subjects. Some of these requirements may be changed by future expert groups as more data become available. The methodology for determining human protein needs particularly for adults is somewhat imprecise, and variation among individuals studied is relatively high.

The public health consequences of varying degrees of protein malnutrition in adults must be better documented. The questions raised by planners in this regard should stimulate work by nutritionists to better define the risks imposed by malnutrition among the adult population. This is turn should help to convince politicians and government planners of the role of nutritional considerations in development planning.

EFFICIENCY OF ANIMAL PRODUCTION

by
M. C. Nesheim

Animals have long been used to convert foods not desired for direct human consumption into a highly prized source of human food.

When animal production uses foods not normally part of the human diet, there is a net gain to the human food chain, but when certain protein and grain sources are used, there is competition between animal production and human food.

The efficient conversion of grains and protein sources to animal products is relatively poor. Table 1 shows the direct efficiency of various animal species in transforming energy and protein from feeds to edible animal products. The data show that, at best, only 20 to 25 percent of the protein and 10 to 18 percent of the energy consumed by various non-ruminant species is converted to edible food. A dairy cow is quite efficient, but beef animals are very inefficient when viewed in these terms.

Table 1. Estimated percentage efficiency of converting feed nutrients to edible products[a]

Livestock	Crude Protein	Energy
Non-ruminants		
Broilers	23	11
Turkeys	22	9
Hens (eggs)	26	18
Swine[b]	14	14
Ruminants[c]		
Dairy cattle	25	17
Beef cattle[b]	4	3
Lambs[b]	4	-

[a] (Total lifetime production/total lifetime input), e.g. for milk protein the calculation is as follows: (protein in all milk produced + protein in edible cuts of carcass)/total feed crude protein input.

[b] Includes only protein and energy in edible cuts. Therefore, if tallow or lard (not included here) were also included, energy efficiency would be much higher. Also, protein efficiency would be increased if offal were included.

[c] A large part of the nutrients for ruminants is from plant resources unsuitable to man; hence, efficiency can exceed 100% if we consider edible product in the animal vs. edible product (to man) in the plant resources.

Source: Reid, Cornell University.

Total efficiency of an animal production system must also include consideration of the feed needed to maintain breeding stock required to produce animals raised for food. Total efficiencies of some animal systems are shown in Table 2. Note that the rate of productivity greatly influences efficiency of the various species. Thus most intensive systems of animal production emphasise measures that ensure high rates of gain, egg production or milk production in an effort to reduce feed requirements per unit of gain.

Table 2. Efficiency with which farm animals produce food proteins[a]

Food Product	Level and/or Rate of Output	Protein[b] Production
Eggs	200 eggs/yr	10.1
Broiler	3.5 lbs/12 wks:	
	3 lbs feed/1 lb gain	11.9
	3.5 lbs/10 wks:	
	2.5 lbs feed/1 lb gain	13.7
	3.5 lbs/8 wks:	
	2.1 lbs feed/1 lb gain	15.9
Pork	200 lbs	
	6 lbs feed/1 lb gain	5.0
	200 lbs/6 mos:	
	4 lbs feed/1 lb gain	6.4
	200 lbs	
	2.5 lbs feed/1 lb gain	8.7
	Biolog. limit (?):	
	2 lbs feed/1 lb gain, no losses	12.1
Milk	7,936 lbs/yr:	
	(no concentrates)[c]	
	11,905 lbs/yr:	
	(25% energy as concentrates)	12.8
	20,000 lbs/yr:	
	(50% energy as concentrates)	16.3
	30,000 lbs/yr:	
	(65% energy as concentrates)	20.5
Beef	1,100 lbs/15 mos:	
	8 lbs feed/1 lb gain	2.3
	1,100 lbs/12 mos:	
	5 lbs feed/1 lb gain	3.2
	highly intensive system:	
	no losses	4.1

[a] These data represent the overall efficiency with which dietary energy is converted to food, as they include the energy cost of reproduction, rearing of breeding stock and mortality as well as that of production itself.

[b] Grams of protein/Meal of digestible energy.

[c] "Concentrates" refers to feeds low in fiber and high in total digestible nutrients. They may be either low in protein or rich in protein.

Source: Reid, Cornell University

Intensive systems of animal production are largely based on the use of grains and protein concentrates to obtain high rates of production.

Ruminant animals by virtue of rumen micro-organisms are able to make good use of forages which are not consumed by the human population. Although their relative efficiency is low, they generally do not compete with man unless they are fed grains in an intensive fattening system.

Non-ruminants, such as chicken and swine, can be raised under traditional systems where they are basically foragers. Rates of production are very low under these systems, but they can make use of food sources not used by man. In areas where grains are in deficit supply for human food, traditional means of raising swine and poultry may need to be encouraged to make maximum use of food available in the environment that is not normally consumed by the human population.

A FRAMEWORK AND A STRATEGY FOR NUTRITIONAL IMPROVEMENTS IN UNDERDEVELOPED SOCIETIES

by
Charles C. Slater

Most of the research, treatment and funds available for nutrition are applied at present to the terminal symptoms of the nutritional problem. To a considerable extent efforts by public health and community development workers to deal with the nutrition problem exacerbate the symptoms, for the very treatment of nutritionally deficient children in situations where the problems are acute induces the death rates to fall so that misery is prolonged. Meanwhile, efforts to promote family planning in order to bring the birth rate back into line with the lowered death rate are inadequate and often nullified by those who are meant to implement the programmes in many underdeveloped nations.

The resources needed to deal with the fundamental nutritional problems of many nations are diverted to activities that are capital-intensive and labour-substituting. Capital-intensive agricultural schemes often displace rural workers, or at best use up the funds that could provide rural jobs so that rural unemployment develops and urban migration moves the nutrition problem to the cities. Thus the treatment of the terminal symptoms of nutritional deficiency, as well as the application of a great deal of capital in rural areas, may have very limited positive benefits when the externalities of diverging death/birth rates and labour-displacing capital are taken into account.

The conclusion is that nutritional problems need to be dealt with in more fundamental terms and that the externalities of present strategies should be more fully accounted. This conclusion is further buttressed if one has the outlook that developing societies are in a dangerous dynamic of demographic and political change. With this frame of reference it is useful to look at two case histories and to reflect on the lessons of their successes and failures, as suggested by this very quick review.

A Pilot Survey of the Food System of Cassava-dependent People o Southern Nigeria

As the "business" member of a "business and biology" team, sketched an approach to this study with David Rogers. Much of field observation was done by Hersh and April who also particip in this pilot study. Starting from the tentative premise that cassava-dependent people of southern Nigeria were calorie defic as well as protein deficient, among lower income urban as well rural households, the starch source cassava was selected as the for study of the alternating actions of synthesis and transfer biological and social level. Viewing the problem in this way a us to see the bottlenecks in the flow of foods more easily, and some appreciation of the multi-disciplinary approach that would needed to fully understand the entire food production and consu system. A sketch of the steps involved may help to illustrate process:

Steps	Relevant Discipli
1. Transfer of seed, clones and other farm inputs and energy	Agronomics
2. Photosynthesis of plant production	Biology
3. Transfer through harvesting and crop assembly	Ag. Marketing
4. Synthesis through processing	Agrobusiness
5. Transfer through distribution and marketing	Marketing
6. Synthesis through cooking	Home Ec.
7. Transfer through meal management and portions	Cultural Anthr
8. Synthesis through metabolism	Medicine

While such a breakdown may appear obvious, it exposes the dependencies of some usually quite isolated disciplines. Moreo the pilot exercise brought to light some shortfalls that had no evident before. The findings can be summarised as follows:

1. Cassava, despite popular presupposition, is rarely eaten alo people over five years of age. The peppery sauces keep the from eating from the family stew pot. (Perhaps consumers co encouraged to keep the sauces bland and let the individual s to taste.) There is a further question of whether the effor enhance the protein content of cassava are a cost-effective of increasing protein ingestion by households using other, a probably cheaper, sources of protein.

2. The soups and stews eaten by the cassava-dependent peoples v protein content, in most cases as a function of income.

3. Infants usually eat a diet of maize pap and sometimes sweete condensed milk. This is often deficient in protein. As th grows older small amounts of cassava are fed, but not the ho which are the source of protein and vitamins.

4. Commercialisation of cassava production and processing is being fostered with little attention to the labour displacement concomitant with large capital investment.

5. Dr. Hahn of the IITA had developed some new varieties of cassava which appear to give yields of up to ten times those of the present disease-ridden varieties being grown locally.

6. There presently is no channel for the diffusion of these new varieties, and some further tests for local adaptability may be needed.

7. The sources of protein, minerals and vitamins of low income households are minor crops not receiving attention from the agricultural technicians.

8. Commercial channels for farm inputs and nutrition supplements are not being fostered by government efforts at present. Seeds for small gardens, water purifying tablets, vitamins, etc. must compete in the shops with caffeine and other nostrums for the consumer's money.

9. Traditional methods of cassava preparation appear to reduce the toxic properties of the natural HCN, and cassava is probably the most economic crop for the region. Thus steps to encourage cassava production may help increase the incomes of the poorest members of the community.

These nine points were developed at a conference at IITA in Ibadan, Nigeria in June 1975. No action has been taken to systematically implement the results of the pilot survey, but perhaps heightened awareness of the problems has penetrated some areas of policy making.

Lesotho National Nutrition Council: Organisation and Development Planning

Planning Assistance, a non-profit organisation from the United States, has been conducting a series of planning conferences in many countries of the world. Many of these conferences concern family planning; another just completed in Guatemala concerned housing development in the wake of the earthquake. These conferences were a response to the felt needs of the nations where they were held. A national nutrition conference was held in December 1975 in Lesotho in response to the needs of the nation and the concern of U.S.A.I.D. because Lesotho is importing about seven million Rand in food aid annually, much of it from the U.S. This discussion is an attempt to convey the approaches that seemed to make the conference a success and the plans for implementation developed at the conference.

First a few words of background may be useful to those not familiar with Lesotho. A nation that has always been independent, except for a period when it was the British trust territory of Basotholand, Lesotho is completely surrounded by the Republic of South Africa. The South African Rand is the currency, and thus Lesotho is fiscally dependent

upon South Africa. With 12,000 square miles and only 12 percent arable land, the nation already has 1.2 million people. About 60 percent of the male work force is engaged in migrant labour, mostly in the mines of South Africa. This makes it one of the most industrialised areas of the world. Miners currently send home on average about 500 Rand per year for saving and for the support of their families. The nation is not self-sufficient in food: Lesotho imports a large share from South Africa and about 10 percent of its total food as aid.

The nutrition problems are not at this time serious by the standards of many African nations, but the possibility that the miners may be forced to return because the mines are mechanised or closed is a serious concern. Thus the nation recognises the need for careful planning to reduce dependence on food aid before the miners return or international shortages reduce the aid imports. It is also necessary to cope with a small segment of society with inadequate nutrition, tentatively estimated at 25,000 households out of about 200,000.

One outcome of the conference was the formation of a National Nutrition Council; another was the specification of a programme of research to begin the planning needed to cope with the small current nutritional shortfall and the longer-run contingency of reduced aid or income from the mines. A third outcome was the specification of the need for technical assistance to assure that the interministerial Council becomes effective and aggressively pursues its mandate.

The research design calls for the generation of useful information to guide the operating ministries in setting budgets for the next fiscal year, starting in April 1977. Five interrelated activities are planned to fill this need:

1. A nutrition status survey which will be compared with the morbidity and mortality statistics of the Ministry of Health. A U.C.L.A. team headed by Dr. Zerfus will conduct this portion of the survey.

2. A study of the consumer food system to identify ways of enhancing nutritional efficiency of the households in the different areas of the nation.

3. A study of the subsistence farm system, particularly the farms of the miners' families. The objective here will be to foster the improvement and expansion of subsistence farmers.

4. A study of the trading system that serves the rural areas of Lesotho, with a view to identifying how trading might more efficiently serve rural households with essential purchased foods at lower prices.

5. A study of the large-scale trading and importing businesses with a view to improving efficiency and limiting the effects of any monopoly elements in the system.

These five research activities are to be completed in six months. The sample size in the consumer survey is expected to be between 500 and 1,000 households. The survey of subsistence farming calls for

samples of about 300 to 600. Trader surveys will include about 100 traders in rural areas. The study of the large traders and importers is an industrial organisation study. The objective is to complete the studies in time for the November meeting of the Council to facilitate consideration of these data in the planning for the 1977 budget.

Parallel to the research activity, a technical assistance programme is planned to help the Council to become more effective. In the Ministry of Planning a senior adviser on community action will assist the Council and attempt to assure that the various ministries and agencies remain interested and committed. This programme will last for three years.

The research activities will be carried out by a team from the National University of Lesotho and one expatriate adviser in residence for eight months. Some assistance will be available for computer processing of surveys and analysis of the data. The objective is to encourage the development of local research capability so that subsequent studies can be done by the local team with a minimum of expatriate consultation.

The likely outcome in the most optimistic circumstances can be sketched as follows:

1. Health monitoring will be facilitated by the U.C.L.A. baseline study and by the data collected by the Ministry of Health. Nutrition-related diseases will be more fully reported and the information will be routinely published in such a way as to indicate clearly the performance of the ministries and agencies responsible for food supply and income distribution.

2. There will be greater acceptance of the need for income distribution analysis in the routine appraisal of social welfare, and the measurement of consumer welfare through household budget studies will be regularised.

3. Subsistence farming will receive higher priority from the Ministry of Agriculture and the other ministries related to the food system. Marginal improvements in subsistence farming can be expected as a direct result of the study.

4. Rationalisation of food distribution channels, particularly of import channels, can be expected. Though vested interests may have raised prices unduly in the past, an indication of the externalities of distribution may lead to reform.

5. Opportunities to market import substitutes will be identified, hopefully leading to more aggressive efforts to meet consumer needs by local production.

6. Key government officials will be made more aware of the drawbacks of any policy which neglects the goal of securing a satisfactory nutritional level.

7. Research capabilities at the National University of Lesotho will be enhanced to meet the research needs of future policy development.

Perhaps some of these activities will be transferable to other countries. The presumption underlying the effort is that nations such as Lesotho are in a dynamic situation and not assured of automatic improvement unless population growth and income distribution are such that the nation's limited resources can provide for the entire society.

As an epilogue, I should note that as a result of participation in this seminar, I shall return to Lesotho with some new ideas on ways to involve the Council members in more effective nutrition planning. At the next National Nutrition Conference in November we shall try to translate the results of research into specific cost-effective programmes, and we shall encourage the Council members to appraise the externalities of the non-nutrition projects in their respective ministries. The next workshop in Lesotho hopefully will emphasise training the Council members to do these things.

SOLVING THE NUTRITION PROBLEM IN TANZANIA

by
T. N. Maletnlema

Introduction

My title, "Solving the Nutrition Problem in Tanzania", is deliberately chosen to enable me to speak of our failures and successes in human nutrition work. In this talk we shall trace Tanzanian efforts to eliminate malnutrition starting from the 1910s up to the present day.

The Problem

The general problem is that many Tanzanians fail to eat enough of the right kinds of foods and as a result they fall ill easily, many die at an early age, and the survivors have a low production capacity.

Causes of Malnutrition

Inability to eat enough can come about if:

(a) The food is not available,
(b) The person is unable to eat and utilise the available foods.

Food Availability in Tanzania: For many years the Ministry of Agriculture has collected crop production data from all the regions, but apart from assembling, the data was not put to much use and gradually it deteriorated to mere sets of figures little related to actual crop production. Efforts are now being made to improve and use the data in planning.

The data indicate a definite preference for maize among the cereals. Maize is grown in every region of the country and is a major staple in eight out of the twenty regions. The next most widely grown food crop is cassava which is a major crop in eleven of the twenty regions, and is a main staple in six regions. The other major foods include sorghum (9 regions), millet (7 regions), rice and bananas (6 regions). Wheat is produced in large amounts in only two regions of the country. Looking at energy production alone, there seems to be little if any change since 1970. Given an average minimum energy requirement of about 8.4 MJ per person per day, production seems very low.

Table 1. Energy food production, 1972

Crop	Quantity Produced (1000 tons)	Produce Remaining After Sales (%)	Food Available Energy (%)	Food Available Protein (%)
Maize	881	74	28	28
Fresh cassava	2039	77	20	6
Millet & sorghum	349	70	7	8
Green bananas	1206	81	7	3
Potatoes	234	61	2	1
Sugar	89	-	5	-
Wheat	98	-	4	4
Rice	171	59	4	3
Others*	-	-	23	51

* Others include beans, milk, meat, oils and fats, fish, vegetables, fruits, groundnuts, etc.

Source: TFNC Diary 1976 (Agricultural data).

P. E. Temu[1] analysed the error in the agriculture data and in his view the figures are 30 to 40 percent below the true production for

[1] P. E. Temu, Ph.D. thesis, Stanford University, 1974.

maize. The corrected figures in Table 2 are more in agreement with food consumption survey results.[2]

Table 2. Average energy production per person per day, 1970-74

	1970-72	1973	1974
Energy production MJ/person/day	6.8 (1623 Cals)	6.9 (1660 Cals)	7.2 (1719 Cals)
Corrected by + 30%	8.8 MJ (2100 Cals)	9.0 MJ (2150 Cals)	9.4 MJ (2250 Cals)

Source: TFNC Diary 1976 (Agricultural data).

Food Processing and Preservation: This has unfortunately been one of the most neglected aspects of food. The little that is known indicates a tremendous loss of produced food. For cereals, the loss is about 30 percent, while vegetables and fruits suffer an even higher loss. Recently too it was discovered that the very small food processing industry had taken to using artificial colours, volume expanders, essence and sweeteners to camouflage foods which were nutritionally useless. Traditional methods of processing and storing foods are known to have been in use in most parts of the country, but with westernisation these methods were labelled primitive and unhygienic. In many communities, these traditional methods have been abandoned in favour of selling the excess crop and buying it later, but unfortunately at a very much higher price and far away from the village. The majority of the rural dwellers cannot afford to buy food due to low income. Traditional fresh weaning foods are also gradually giving way to the complex modern baby foods which are fully backed by the thrust of modern advertising, food science and technology. Much as we welcome the science and the technology, we would like it to serve our needs rather than man adjusting to the technology simply because it is available, as has been the practice in the western world. Importation of modern baby foods has continued to cost the country an ever increasing sum of foreign currency. The question one must ask is this: does the imported baby food help in solving the malnutrition problem? The answer is certainly "yes", but it also helps in causing even more malnutrition than it cures, and for developing countries tinned baby milk and cereal-based baby foods need much more careful use than our technical and social system allows at the moment. All of you, I have no doubt, have heard of the Nestle case now in progress in Bern, where a baby food manufacturer is accused of killing babies. I need not go into the details of the case, but one thing is obvious: commerciogenic factors are increasingly important causes of malnutrition and steps to curb this must be taken by leaders such as you.

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[2] T. N. Maletnlema, et al., Tanzania Notes and Records, 73: 1974, and "Household Budget Survey", Dar es Salaam, 1976.

Food Consumption: Regional surveys conducted in seven regions of the country indicate various problems of malnutrition. The most prevalent and economically significant form of malnutrition is protein-energy deficiency. The surveys also indicate that the problem is mainly that of energy deficiency, rather than protein deficiency. Many hospitals in the country admit cases of marasmic-kwashiorkor and marasmus, but very few cases of pure kwashiorkor (sugar baby type) are seen and only in the banana and cassava staple areas. I estimate that if one could just increase the energy intake by about 10 percent with the present food, the protein gap would be eradicated, but the energy gap requires a 20 to 30 percent increase. Economically this is a great drawback. The outdated saying by our colonial rulers that the local people were lazy is based on this, although it was unknown to them then. Energy expenditure studies (three studies only) indicate an increase of work output with increased energy intake and vice versa. Communities reputed to be lazy were in most cases consuming much less than 8.0 MJ per day (ca. 2,000 Cals).

The various aspects of the problem of food intake have been discussed, such as custom, preparation methods and equipment, health status of the consumer, etc. We need not dwell on these except to stress the effect of diseases on food intake. The majority of cases presenting to hospital with malnutrition come from families with other relatively well nourished children. Investigation often reveals that the victim in hospital had repeated attacks of diseases culminating in a clinical syndrome of malnutrition. A small study of foods given to children in a village 20 miles outside Dar es Salaam gave an intake well above the requirements of the children of that age (1-5 years). During the short survey it was not possible to record how often the children failed to take the available food, but recurrent colds, tonsillitis, tracheobronchitis, measles, malaria, gastroenteritis and the accompanying fever, diarrhoea, vomiting, loss of appetite and the inevitable rise in nutrient requirements by the sick body are by themselves sufficient to render any marginally well-fed child malnourished. To a certain extent this is true for adults too, but in the case of adults diseases, even minor ones such as colds do more harm by reducing capacity for work (morbidity) and hence food production and availability. Thus in tackling the malnutrition problem, diseases must be given a very high priority.

The Problem as the Hospitals See It

As stated earlier, protein-energy malnutrition (PEM) of the deficiency type (marasmus and kwashiorkor) affects over 10 percent of our children. However, if doctors could make multiple diagnoses, over 50 percent of paediatric cases would show an underlying degree of malnutrition. Thus, although severe malnutrition comes fifth among the causes of child mortality, its toll is actually much higher. Cases diagnosed as death due to measles, respiratory infections, malaria and gastroenteritis are actually death due to malnutrition.

Anaemia is the second most common form of malnutrition. Iron intake seems adequate, but the form in which it is presented may not

be suitable for digestion and absorption. On the other hand, haemorrhage (hookworms and schistosomiasis in adults and older children) and haemolysis (malaria in children) cause more anaemia than iron deficient diets. Kwashiorkor is invariably accompanied by anaemia, and avitaminosis often occurs with anaemia especially folic acid deficiency common in pregnancy.

Avitaminosis A is also a very serious condition in some parts of the country, especially where it occurs with a high incidence of conjunctivitis (trachoma, etc.). Other forms of malnutrition include endemic goitre, avitaminosis B (sporadic), fluorosis and, although clinical evidence of calcium deficiency is not convincing, dietary surveys show a very low intake (see Table 3) of this element.

Table 3. Food intake in Tanzania per person per day (summary of five surveys, 1966-1971)

	Intake	Recommended Intake (Tanzania)
Energy, MJ	6 - 10.5	8.5 - 10
Ref. Protein, GN.	24 - 35	Adults 0.59 gm/kg body weight per day Infants 2.0 gm/kg body weight per day
Calcium, mg.	310	600 mg.
Iron, mg.	16	15 mg.
Vit. A µg. retinol	220	1000
Vit. C, mg.	55	40 - 50
Thiamine, mg.	1.0	1.5 mg (1.0 mg/7.0 MJ)
Iodine µg.	low	100 - 350
Fluorine mg.	low/high	1.0 (1 p.p.m.)

Steps Taken to Eliminate Malnutrition

In the first decade of the twentieth century, the Germans made a number of attempts to improve nutrition status, but apart from the studies reported,[3] no serious action was taken. After World War II, the British took a step further by studying prisoners and labourers and improving their diets with very encouraging results that gave impetus to the work which followed. In most cases work was done by interested groups or individuals, but in 1947 an office which later became the National Nutrition Unit was established under one officer in the Ministry of Health.[4] The activities of this unit increased people's interest in nutrition both within and outside the country,[5] and other nutrition units began to emerge in the Ministries of Agriculture and Education and in a few voluntary organisations. This was certainly a step in the right direction, but it had its difficulties.

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3 O. Peipper, Kilwa Study of Child Mortality Causes, 1910, and Dr. Ihemeire, Moshi/Arusha Study of Mother and Child Welfare, 1913.

4 Mohamed and McKeag, History of Nutrition, 1970.

5 LISHE, Tanzania Nutrition Journal 1 (1), 1976.

In some cases unhealthy competition developed and from each unit different ideas arose, leading to a period of public confusion. As this situation worsened, the need for an executive, coordinating body became obvious, and those concerned worked for over five years (1968-1973) to form such a body. It may sound ridiculous, but it took us that long to come to an agreement on what to do, and even after this consensus and an Act of Parliament to support it, it took another eighteen months for the Centre to become a reality.

Today the Tanzania Food and Nutrition Centre (T.F.N.C.) is just over one year old and already its activities are beginning to have the required effect.

The Tanzania Food and Nutrition Centre

Established by an Act of the Tanzania Parliament in December 1973, the Centre is empowered to do the following:

1. Plan and initiate food and nutrition programmes in Tanzania,
2. Review nutrition and food programmes,
3. Provide facilities for training in nutrition, including plans to start a school of nutrition,
4. Carry out research on food and nutrition,
5. Advise the Government and other institutions on matters relating to food and nutrition,
6. Stimulate and promote, among the people of Tanzania, an awareness of the importance of a balanced diet and of the dangers of malnutrition,
7. Establish public confidence in the methods suggested by T.F.N.C. for the correction and avoidance of malnutrition,
8. Collaborate with the Ministry of Finance and Planning and the Prime Minister's Office in ensuring proper national and regional planning and implementation of projects,
9. Ensure proper nutritional value and suitability for human consumption of foods marketed in or exported from Tanzania,
10. Disseminate nutrition research results to the Government and the people of Tanzania,
11. Participate in international nutrition meetings, and
12. Do all other things that, in the opinion of the Governing Board, will help solve the problem of malnutrition in Tanzania.

To carry out the above duties, the Centre is organised as indicated in Figures 1 and 2.

Among the few very pressing subjects that T.F.N.C. has dealt with, three deserve mentioning, but we shall only elaborate on one.

1. Food industry and standards,
2. Food and nutrition policy, and
3. Food development with particular emphasis on weaning foods.

Figure 1.

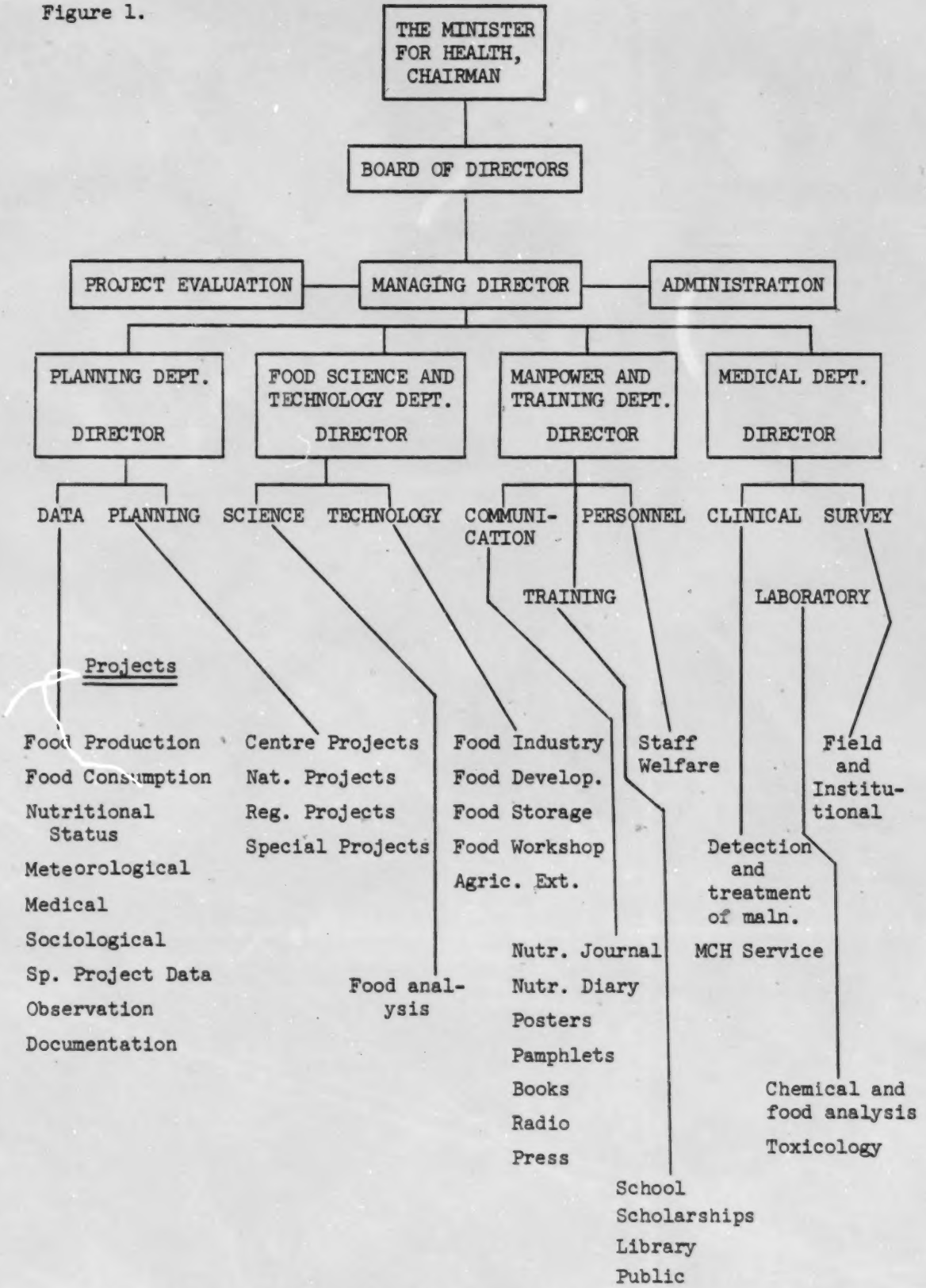
THE MINISTER FOR HEALTH, CHAIRMAN
BOARD OF DIRECTORS
PROJECT EVALUATION
MANAGING DIRECTOR
ADMINISTRATION
PLANNING DEPT. DIRECTOR
FOOD SCIENCE AND TECHNOLOGY DEPT. DIRECTOR
MANPOWER AND TRAINING DEPT. DIRECTOR
MEDICAL DEPT. DIRECTOR
DATA
PLANNING
SCIENCE
TECHNOLOGY
COMMUNI-CATION
PERSONNEL
CLINICAL
SURVEY
TRAINING
LABORATORY
Projects
Food Production
Food Consumption
Nutritional Status
Meteorological
Medical
Sociological
Sp. Project Data
Observation
Documentation
Centre Projects
Nat. Projects
Reg. Projects
Special Projects
Food analysis
Food Industry
Food Develop.
Food Storage
Food Workshop
Agric. Ext.
Nutr. Journal
Nutr. Diary
Posters
Pamphlets
Books
Radio
Press
Staff Welfare
School Scholarships
Library
Public
Detection and treatment of maln.
MCH Service
Field and Institu-tional
Chemical and food analysis
Toxicology

Figure 2.

COMPOSITION			DUTIES
MINISTER HEALTH - CHAIRMAN			Policy making Important decisions
3 MP 1 UWT 3 DIRECTORS	H E Agr.	1 UNIV. 1 N.SC.R.C. 2 TANU(D.C.)	Board
EXEC.SEC. & CLERK		1 P.M.O.	
CHAIRMAN OR VICE-CHAIRMAN 4 BOARD MEMBERS			Exec. Comm. — Acts on behalf of Board
MAN. DIRECT. - CHAIRMAN 4 DEPARTMENT DIRECTORS			Management & Implementation — Planning ahead Planning action for approved and funded projects Management decisions Administration matters
Project Officer(s) Dept. Dir. & Asst. & Contact Officers			Action Officers — Implement specific projects Report progress Suggest new plans or modification
Ministry Officers Parastatal Officers Voluntary Agency Officers U.N. & Other Agency Officers			Contact Officers — Implementation of project Data collection Cross planning
Tanzanian Specialists Non-Tanzanian Specialists			Advisors — Individually or as an expert committee advise T.F.N.C. on specific projects

The Draft Food and Nutrition Policy Document

To date, Tanzania has no official document on food and nutrition policy, but bits and pieces of the policy are found scattered in other official documents of the Government and TANU. In order to enable planners

to have the policy in one logical document, T.F.N.C. has compiled what is now a draft of a Food and Nutrition Policy for Tanzania. The document is subject to amendment and approval by an Expert Committee appointed by the Governing Board of T.F.N.C. Let me now review the document briefly:

Main Objectives:

1. Provision of adequate and balanced food for all,
2. Elimination of malnutrition and related diseases,
3. Raising the standard of living through higher productivity and income, and
4. Eradication of ignorance about food, nutrition and disease.

The Present Situation: Malnutrition is described as a multifaceted problem, affecting about 25 percent of the population, and to overcome it every aspect must be tackled simultaneously. The three enemies of development singled out in the TANU Declaration can be taken as the aspects of malnutrition which must be tackled. Poor production is probably the root of the problem, followed by an equally important factor, diseases, and both of these supported firmly by ignorance.

Food Production:

> Since our smallest registered community unit is the village in which 90% of Tanzanians live and work, production plans and work must also start at this level...To ensure the attainment of this goal, the government is now training village planners and managers...The task at district and regional level is to strive for a self-sufficiency by coordinating and guiding village plans and production...
>
> Whereas in the past a lot of government effort has gone into cash crops production, more will now be diverted to food crops...Specific food and nutrition agriculture extension workers now on training should be increased to cover all villages...Food wastage problems will be studied and steps taken to solve the problems...

The document goes on to discuss food processing, preparation, imports and exports legislation and the consumer.

Diseases: The problem is defined in detail and targets mentioned. Priority is given to mother and child health services to be followed by school children, old and disabled persons and finally workers. The document goes on to discuss food processing for special groups, diseases related to malnutrition and steps taken to prevent them.

Food standards control is mentioned briefly.

Ignorance: The Adult Education Institute is a large, well established institute with nation-wide projects and staff in every division

of the districts. Through this body, nutrition education is being directed to the nation as a whole. (The "Food is Life Campaign" is but one example.) However, suitable reading material is missing a... the document stresses that "...organisations concerned with n... education should encourage capable authors to write books on l... conditions." Emphasis is then laid on nutrition education at school and university and the need for training specific staff at village, district and higher levels.

Finally, the document treats food and nutrition surveillance, surveys, research and priority programmes. "...Programmes must emerge from villages, reflecting the will of the people, be aggregated at district and regional level and eventually compiled into national programmes."

REALISM AND SELF-RELIANCE IN FOOD PRODUCTION

by
J. McDowell

The Starting Point

Those of us who are trying to seek feasible and logical solutions to food and nutritional problems in Africa today are faced with a very complex situation. Those who have attempted to tackle the problems before us have left us with a mass of ideas, information and misinformation.

We must, if we are honest, admit that many of the earlier approaches to general nutritional improvement were based on questionable preconceptions and on misconceptions. Many arose from the general belief that foods, food practices, and food production techniques from the industrialised world would be appropriate for Africa. We have passed through the phase of the "protein panacea"; we have observed that high-input import-dependent agriculture is not only economically insupportable but can also be ecologically disastrous; and we have discovered that of the many commercial weaning food projects which started out with such high hopes, none has been economically viable, and none has made any significant contribution. Applied nutrition projects have produced poultry and eggs mainly for sale to the already well nourished, who alone can afford them, and expensive dairy plants have taken milk away from the rural areas for sale to the urban elite.

The Crossroads

At the moment, we stand at a crossroads, wondering which direction we should take. Should we continue to follow the signpost labelled "PROTEIN PRODUCTION"; should we take the road called "GREEN REVOLUTION"; or, perhaps, that labelled "ECONOMIC DEVELOPMENT - FIRST"? Shall we follow these familiar and well-trodden roads which always seem to bring us back in a circle to the same crossroads, or do we take the rather rough looking and misty road signposted "REALISM"?

This paper sets out to take a few faltering steps along t road.

"Nutridynamics"?

The first law of thermodynamics says, in essence, "Work i and heat is work". If we think of food in basic terms we coul haps invent the new discipline of "nutridynamics", of which th law will be "food is work (energy) and work is food". This, o is no new principle, since it is succinctly stated in the Book Genesis as "In the sweat of thy face shalt thou eat".

The production of food demands inputs of energy. The pri source of all our food is the green plant which, with the aid energy, converts elements from the atmosphere and the soil int stances which man and animals can eat. Inputs of human, anima chanical or fuel energy are necessary for its cultivation in a nised manner. Energy is needed to produce and transport ferti and agrochemicals and to harvest, prepare, process, package, d and cook foods. In the industrialised world, where there is p waste of energy in the name of "productivity" and "efficiency" probably requires an input of nine kilo calories of energy to the consumer with one kilo calorie of food energy. Energy is pensive commodity as we are all, at last, beginning to realise the greater the energy input required, the greater the cost of food. Thus, if we want to produce food at low cost for people only afford to buy low-cost food, we must aim for maximum effi in energy utilisation. This means, in effect, maximum use of cheapest forms of energy which, in present day Africa, means m use of solar, animal and human energy.

It is, perhaps, salutary to consider that traditional Afr agricultural systems rate very highly in the nutridynamic effi scale. The traditional farmer in these terms is highly produc getting quite a lot of output for very low inputs of non-solar This is hardly surprising, since the traditional farmer uses m which are based on knowledge and wisdom gathered and handed do thousands of years. Working within the constraints of the env he has, by patient trial and often disastrous error, developed which are ecologically adapted and which give a high probabili success. If he had not done so he would have become extinct. we, so far, ignored, and even derided, traditional agricultur rather than building upon and improving it, why have we set ou replace it with energy-hungry import-dependent western agricul which, inevitably, produces high-cost products?

The Converters

Plants are the primary converters, and many produce tiss seeds and fruits which we can eat. The animals are the second verters eating the plants and producing meats, fats and, in so eggs and milk, which we can eat. The ruminant animals are spe valuable since they can eat plants which man cannot digest, an

convert them into edible food. The non-ruminant animals, pigs and poultry, generally require the same kind of foods as man, and thus in any large-scale production system tend to compete with man for available supplies of food.

Animals are inefficient converters, since 100 pounds of protein fed to an animal will give only a yield of 10 pounds of meat protein, thus wasting 90 percent of all the protein consumed. In a situation of food scarcity it is nutritional folly to use arable land to grow crops for feeding to animals. If we insist on having animal protein, the only logical method of producing it is from ruminant animals foraging on plants which man cannot eat, and which are growing on land which could not be used to grow edible crops.

The use of animals to produce meat, eggs or milk by feeding them on foods which man could eat, or by feeding them on foods grown on land which could have been used to produce food crops, or--worst of all--importing foods to feed to animals, is a luxury which no developing country can afford.

It is no coincidence that the traditional African farming systems are based on direct use of arable land, and on use of ruminant animals which are grazed on land which is not being cultivated. The level of poultry and pork production (if any) is small since such production is based on feeding these animals on household wastes, and on whatever they can find by foraging.

Proponents of western-type animal production based on cultivated pastures will, of course, remind us that by providing manure, grazing animals help to improve the fertility of the land where they are grazing. This argument is hardly tenable. The grazing animal is merely recycling nutrients. Rather than having the animal eat the grass and return only a fraction of what it consumes, we could get a much greater increase in fertility by simply ploughing in, as green manure, all of the pasture on which the animal is grazing.

Conversion of Nitrogen

It has to be realised that the plants are energy converters and element assemblers. They cannot produce protein unless they are supplied with nitrogen and sulphur. Every ton of protein produced by plants takes at least one-sixth of a ton of nitrogen, or the equivalent of one ton of ammonium sulphate out of the soil. The cereals require that their nitrogen be supplied to them in the form of ready-made nitrogen compounds which can come only from the soil or from nitrogen fertilisers added to the soil. Thus, if we grow high-yielding cereals we must add nitrogen fertilisers which have to be imported. The protein produced by hybrid maize, for example, is made from nitrogen imported at great expense. It is, in fact, locally-assembled imported protein.

The leguminous plants on the other hand, i.e. groundnuts and the wide range of beans, peas and grams, have the ability to fix nitrogen

directly from the atmosphere. They do not require imported nitrogen, and do not deplete reserves of soil nitrogen. On the contrary, they help to build up nitrogen reserves in the soil and, if grown in close association with cereals, can help to supply some of the nitrogen which the cereals need. Legumes are, thus, the most logical source of protein.

Once again it has to be noted that traditional subsistence food production relies heavily on legume protein, and also on inter-cropping which allows legumes to contribute to the nitrogen needs of cereals.

High-input Farming and the Environment

Continuous plant production without replenishment of minerals such as potassium and phosphorous will eventually leave the soil barren. The western agricultural techniques require the addition of NPK (i.e. nitrogen, phosphorous and potassium) fertilisers--for which the ingredients, or the fertilisers themselves must be imported at great expense, and at the cost of scarce foreign exchange. The traditional farming systems get around these problems in a different way, by shifting cultivation and by burning bush on new land before it is cultivated, thus returning potassium and phosphorous to the land. Often, the last crop to be planted before allowing the land to rest under fallow is a legume, like pigeon peas, thus helping restore solid nitrogen from the limitless reserves of the atmosphere.

The burning of the land before planting also has a further advantage in that it can destroy weed seeds, insect pests, and the spores of pathogenic fungi.

Fertiliser-based farming does not restore the organic matter or humus on which the soil structure and the activity of soil micro-organisms depend. The dust-bowls created in the middle-west of the U.S.A. by this type of farming provide a horrible example which we ignore at our peril in developing Africa.

The use and the misuse of toxic and persistent insecticides have already created serious ecological and environmental problems in the developed countries, but yet we continue to encourage their use in Africa. Is this logical?

Africa is a continent where a precarious water balance exists, and where many areas possess only marginal potential for arable farming, yet this does not always seem to be taken into account where choice of crops by the proponents of western farming is concerned. If by dint of expensive farming techniques, we manage to treble the yield of maize from an acre of land, we must recognise that we have also trebled the extraction of water from that acre. Maize has a very high water demand in comparison to, say, finger millet or bulrush millet--one has only to look at its succulent foliage to see why--yet we find the production of maize being encouraged in areas where the traditional farmer with his inherited ecological awareness had formerly grown millets.

Productivity, Production and Preservation

Productivity is the ratio of what we get out to what we put in. The productivity of traditional farming is often erroneously criticised by those who equate productivity with high yields, forgetting that a low yield which requires low inputs can be more productive in absolute terms than a high yield which needs expensive inputs. In Africa it can be better to have a low yield of food which people can afford than a high yield which no one can afford to buy. High-yield high-input farming, where inputs must be imported, is a sure means of importing inflation.

We find that every time food problems are discussed the one major solution--"we must increase production"--is always promoted and adopted. Increasing production is generally thought of in terms of high-input farming, forcing countries to become dependent on imports of machinery, fertilisers and pesticides which they can ill afford. Traditional farming is never considered despite the fact that, at the present time, the largely traditional farming systems of Africa produce 20 to 30 percent more food than Africa needs. How can this be if Africa is short of food?

The fact of the matter is that 30 percent and more of all the food produced in Africa is wasted. If all the food produced in Africa were to be made available there would be no scarcity, no need to import food, and no need to worry about meeting the food needs of expanding populations for the next decade or so. There thus seems to be no need to westernise or "modernise" African farming, or to spend vast sums of money importing the essentials for increased production. All we need to do is to prevent the massive waste of food already produced. Trying to increase production without doing anything about reducing waste is like trying to fill up a bucket with a hole in the bottom. Even if we managed to increase production by say five percent the total increase would only be about three to four percent because one third of the increase would still be wasted. Why do we persist in the folly of trying to increase food production without doing anything about food conservation?

Do we also realise that we can conserve food without all of the expensive, toxic and ecologically dangerous insecticides which western agribusiness is so anxious to sell to us? Do we realise that it is possible to conserve foods at farm level without these products? If not, it may be necessary to remind ourselves that one of the most effective food conservation projects ever reported was operated in Africa thousands of years before malathion, or lindane, or D.D.T. was ever thought of. The Book of Genesis tells us how, when famine was widespread throughout the known world, the people of Egypt through timely and effective attention to conservation had enough food to last them and neighbouring countries through seven years of famine. If Egypt could do it thousands of years ago why can we not do it now? The methods are available and awaiting application.

New Under the Sun

Over 2,000 years ago, Ecclesiastes described the life of the rural peasant in the following words: "All things are full of labour;...that which is done is that which shall be done...and there is no new thing under the sun." These words might be interpreted as: "In order to survive we must work; the rules of survival are immutable--we adapt and conform to the constraints imposed by the environment; and the knowledge and wisdom we need to do this are already available and waiting to be used."

As the foregoing brief consideration indicates, the African peasant farmer has already developed a vast fund of knowledge and wisdom about efficient low-input, low-cost food production. He has developed and used agricultural techniques which permit efficient conversion of the energy and mineral resources available, and he does not engage in prodigally wasteful practices such as the expenditure of energy to grow food specially for the low-efficiency animal converters. He does not have "scientific" reasons for his practices--he just knows what works and what does not work. We who must seek for the "scientific explanations" will find them if we study his practices. Those agriculturists who are now studying intercropping and the symbiotic and antibiotic relationships between plants, insects and soil microorganisms in the mini-ecologies of various mixed-cropping systems are finding that these systems have hitherto unsuspected possibilities. One very good example is the intercropping of groundnuts and maize whereby the legume not only contributes to the nitrogen needs of the cereal, but also provides a favourable habitat for the wolf spider which is a natural predator on the corn-borer moth, thus generating a system of biological pest control which is more efficient than the frequent use of sophisticated and expensive chemical pesticides.

By rejecting and seeking to replace the African systems of agriculture and by throwing away the vast heritage of wisdom upon which they are based, we risk committing a grave folly and, perhaps, losing the only opportunity we have to develop a logical approach to the production of food for a low-income society.

The Road Ahead

Having gone a little way along the road marked "realism" we must be willing to follow wherever it leads, and must face up to the problem of population pressure, and the realisation that in a continent of 400 million people, population is increasing by 2.5 percent each year. Could farming based on traditional systems cope with this increase?

If we pose this question we must also pose its corollary: "Can transfer of western agricultural methods be effected in a manner which is likely to provide low-cost foods for all of those people?" Experience of over the past twenty years or so would indicate that the answer to this question is "no".

If we consider that of every 100 tons of food produced at present only 70 tons is available and 30 tons is lost, it is a matter of simple arithmetic that prevention of all waste would result in an increase of 30 tons on 70 tons, i.e. a 42 percent increase. If present losses could be reduced by half, i.e. an increase of 15 tons on 70 tons, food availability would be increased by 21 percent, i.e. enough extra food to cope with the population increase for the next decade.

This degree of increase in food productivity is certainly much greater than could be hoped for from current attempts to "modernise" food farming and--most important--it can be achieved without the need to spend money on any additional imported inputs whatsoever, since the food is already being produced.

Since we are being realistic we must also look at the practical business of achieving better food conservation, whether this would be feasible and how much it would cost. First we should bear in mind that Egypt did it many thousands of years ago. Surely what they did then we can do now. Secondly we should consider that we would be dealing with conservation at the small-farm level where very simple and virtually no-cost techniques can be applied. These techniques are exemplified at the Village Technology Unit at Karen, near Nairobi, and are eminently feasible. Thirdly these techniques are not new, they are part of the traditional heritage which is presently being eroded by promotion of "modernisation". An extensive campaign would be necessary to promote farm-level conservation but this could be mounted by diverting to conservation the extension effort currently being devoted to modernisation of production.

Concurrently, improved conservation would allow a ten-year "breathing space" when food would be plentifully available, and during this time it should be possible to develop traditional farming techniques to a higher level of efficiency, to further improve the extent of conservation achieved, and to look confidently to meeting the food needs of the 1990s.

Thus, if we travel far enough along the road marked "REALISM" we will find another signpost which reads "REAL INDEPENDENCE AND FREEDOM FROM HUNGER - VIA SELF RELIANCE".

The longest journey begins with a single step. Shall we, who are concerned with food policy planning, have the courage to take that step and stride boldly along the "REALISM" road?

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GROUP I: PLANNING FOR NUTRITIONAL SELF-SUFFICIENCY FOR UJAMAA VILLAGES IN THE CONTEXT OF TANZANIA'S GOALS FOR NATIONAL DEVELOPMENT

Introduction

Tanzania has an area of 983,063 Km^2 of which 53,483 Km^2 are under water. The total human population stands at 15 million with an average population density of 15 persons per Km^2 which varies from 1 to 220 people per Km^2. Over 92 percent of the population is in the rural area. The age distribution of the population is 47.7 percent from 0 to 14 years, 46.0 percent from 15 to 49 years, and 10.3 percent 50 years and older.

The greater part of Tanzania is semi-arid with an annual rainfall of 750 to 1000 mm. There is one rainy season of three to four months and a dry season of eight to nine months per year. The rainfall distribution pattern must be considered in developing an agricultural policy which would ensure adequate food production and distribution to meet both calorie and nutrient requirements of the population throughout the year.

Food Intake and Nutritional Status in Tanzania

Dietary and nutrition surveys and food balance sheets for Tanzania indicate that on average intakes of energy, thiamine and iodine are low, while vitamin A is very low and protein intake just about adequate. Results of studies of childhood malnutrition (protein-energy deficiency) in four regions of the country show that there is a peak of 39.3 percent malnourished at 18.23 months of age.

Ujamaa Village as a Production Unit

Tanzania has identified its strategy for development as being through Ujamaa villages. These are villages that must have defined boundaries, be registered with the Government and must have 250 to 650 families, each made up on average of 5 members. Ideally, members of

Ujamaa villages are expected to live communally, that is each member of the village must be involved in productive activities that would contribute to the well-being of the village community as a whole. Since Tanzania is an agricultural country, communal farming (crops and to some extent livestock, in particular poultry and dairy animals) is expected to be the basic undertaking of the Ujamaa villages though such other activities as carpentry, consumer shops and the marketing of crops, etc. are in some villages being undertaken on a communal basis. The Government of Tanzania looks upon Ujamaa villages as the basic production unit in the country as well as the best means by which the Government can provide such amenities as schools, hospitals and other infrastructures to the majority of Tanzanians. Each Ujamaa village has a village Development Committee which is responsible for initiating development plans for the village.

A group of Ujamaa villages make up a Division, a number of Divisions constitute a District, and Districts are grouped together to form Regions. In mainland Tanzania there are twenty regions.

Nutritional Self-sufficiency and Improvement in Nutritional Status for an Ujamaa Village and for Tanzania as a Whole

Increased agricultural productivity per unit of land, reduction in losses of total food and nutrients through all the phases of food handling, equitable distribution of the food throughout the community and the proper utilisation of the food by a given community--these are the prerequisites for nutritional self-sufficiency in an Ujamaa village. To achieve this, it is necessary first that members of an Ujamaa village be acquainted with and be exposed to agricultural practices and techniques that will ensure maximisation of their efforts and enhance their capabilities in food production, distribution and utilisation. Second, it calls for elimination of disease, improvement in the transport system within the village and the country at large, provision of marketing facilities, implementation of education programmes on nutrition, and hygiene consonant with the improvement of the nutritional status of the community. Third, for an Ujamaa village to achieve nutritional self-sufficiency and improvement in nutritional status of members of the village, there is a need for knowledge of potential and actual food supplies in that particular village, as well as the nutritional status and nutritional needs of all the segments of the population. To illustrate this point a hypothetical village, named Chemweno, in Central Tanzania has been taken as an example.

Food requirements by the village, taking account of losses during all the stages of handling, have to be calculated. This is shown in Appendix I for requirements of protein, calories and vitamin A.

In arriving at the results shown in Appendix I no attempt has been made to consider the possible influences on nutrient requirements of disease, age distribution within the population, physiological factors, environmental effects and possible interaction among different

nutrients. The contribution of cereals to the protein supply of the population on the one hand, and on the other hand the energy contribution of the legumes to calorie requirements, have not been computed. It has further been assumed that once calorie, protein and vitamin A requirements are met from the consumption of cereals, legumes and vegetables (Mchicha), other nutrients would also be supplied in adequate amounts. Furthermore, despite the fact that zebu cattle, goats, sheep and poultry are kept in the village, the intake of animal protein is likely to be negligible.

Food production by the village to meet its requirements has also been calculated (Appendix II). The main crops considered suitable for the area as major sources of energy are sorghum and millet, with cassava making only a small contribution; for protein supply legumes have been considered as the major source. Amarauth (Mchicha) has been taken as the main vegetable for the supply of vitamin A. The vegetable has been considered a backyard farming activity.

In arriving at the figures for food production it has been assumed that the active work force in the village is only 25 percent of the total population in any one year, despite the fact that with improving medical services the active work force should tend to increase. It has further been assumed that all the grain produced is utilised as human food in the village and none is used to brew alcohol or smuggled out of the village. No specific cash crop has been considered in this village; surplus food crops would be the main cash-earning undertaking.

Improvement in Food Pr duction and Nutritional Status in the Ujamaa Village

In order to increase food production above subsistence level and at the same time improve the nutritional status of the community a number of programmes have been undertaken. These are:

1. Use of oxen and ploughs in cultivation. Institutions such as schools are encouraged to cultivate shambas with the advice of agricultural experts in the village.

2. Use of farm-yard manure whenever possible, and fertilisers provided by the Government at subsidised cost.

3. Communication and transport facilities are provided in the form of oxen and carts to transport produce and other goods. Also the construction of four feeder roads is undertaken through self-help schemes. The roads radiate into the four directions where the fields are situated and all converge to the centre of the village where a district road is most likely to pass. A small workshop for repairing farm implements is provided in the village.

4. Improvement in storage facilities using intermediate technology. This is coupled with efforts to reduce milling losses.

5. Marketing facilities for produce and other goods have been introduced at the centre of the village. Marketing of produce is through a primary co-operative society which is the village itself. Surplus food crops are purchased from the village by the National Milling Corporation.

6. Nutrition education concerning better methods of food production, storage, hygiene and the preparation of nutritious food is undertaken in primary schools, through radio broadcasts, maternity and child health programmes, and functional literacy classes to mothers and fathers and others. To meet the need to mobilize people in response to nutritional education, political education is also undertaken through all the channels indicated above.

7. Provision of school meals utilising the food produced by the schools themselves. This arrangement provides a means of educating school children on the meaning of self sufficiency in food, application of proper methods of agricultural production, food utilisation and what constitutes proper nutrition.

As disease affects the productive potential of a population and also may lead to poor utilisation of food, attention is directed to both curing and preventing disease in the village. Programmes towards this end include:

1. Integrated maternal and child health services that provide antenatal and postnatal care and a family planning scheme. These programmes are undertaken at clinics and dispensaries where the requisite manpower is stationed. (Pre-school feeding programmes are also undertaken at the clinics.)

2. Mosquito eradication, sanitation campaigns such as refuse collection and disposal, and digging latrines and ensuring that they are used.

3. Provision of clean water and the encouragement of members of the Ujamaa village to build permanent houses through self-help schemes.

4. Keeping proper records at dispensaries and clinics on birth and death rates and increases in weight and height of children in the village.

Supply of Trained Manpower

All available trained personnel in the village, such as school teachers, agricultural extension staff and the rural medical aide who runs a dispensary with his staff, are coordinated by the Village Development Committee to ensure that they contribute effectively to educating members of the Ujamaa village in their respective areas of expertise: overlapping and conflicts among the various "expert" personnel are minimised by ensuring that they work as a team. Funds to run schools and dispensaries and to construct bridges are provided by the Central Government, while labour for the construction of schools or feeder roads for instance, is provided by the village.

Implications of the Plan for National Nutritional Self-sufficiency

The different ecological zones that exist in Tanzania are to be exploited so that self-sufficiency in various basic food items is achieved. Ujamaa villages in the different parts of the country are expected to specialise in the type of agricultural production best suited to their areas. However each village is at the moment being urged to ensure that it is self-sufficient in food. Surplus food from one village is expected to be sold to another village which may have an inadequate supply of that particular food. In this way the production of surplus food crops is looked upon as an opportunity to earn cash. Where conditions are conducive for cash crops such as cotton and oilseed, villages are advised to increase their output of these crops while at the same time ensuring that their food supply is adequate. At the moment the bottlenecks in the implementation of this policy have been poor communication systems and transport facilities, inadequate storage facilities and poor marketing of produce.

Early Warning System

The early warning system is aimed at providing a means to predict and assess food supplies in the Ujamaa villages at any one particular time. It is a management tool for the operation of a "food security" system, whereby possible food shortages and surpluses are identified well in advance so that planners can determine ways to deal with the situation.

At the village level, the Chairman of the political party (TANU), working with the ten cell leaders and members of the Village Development Committee, watches food stocks in the village and estimates likely yields. Where indications are that food will be in short supply, the District Development Director (chief administrative officer of the District) is informed. The DDD looks for food in the area and informs the Area Commissioner who may in turn inform the Regional Commissioner if the situation cannot be met with resources in the District. Area Commissioners have in the past issued decrees stopping people from roasting maize on the cob where there were indications that the maize crop for the year would be poor. On other occasions when it was indicated that a particular food would be in short supply, Area Commissioners have banned the movement of that food or restricted the amount which could be taken out of the District. Food stocks, mainly of grains, are checked between harvest time and cultivation time, during cultivation time and where possible every three months.

Surveillance System

This is a continuous process of monitoring all possible indicators of trends in food supply and nutritional status throughout the country, while at the same time monitoring the effectiveness of food and nutrition policies and programmes. Properly undertaken, surveillance systems should aid planners in determining what intervention programmes should be undertaken.

Components of a Surveillance System

1. Nutritional Assessment Surveys Involving Anthropometric Measurements, Biochemical Methods or Clinical Examinations: Surveys of the nutritional status of children under five, perhaps by measuring weight and height in terms of age, give a very good indication of the nutritional status of the community. Records on birth weight, weight gain and increase in height by dispensaries are also a good source of information for evaluating the nutritional status of the community.

2. Dietary Surveys: These involve surveying which foods are consumed and in what quantities by a random sample of people in the village.

3. Agricultural Surveys: These involve collecting data on the area under cultivation, the percentage of crops which germinate and flower, the amounts harvested and the incidence of pests and plant diseases.

4. Food Stock Assessment: This is carried out in the village during planting time and midway between one harvesting season and the next planting season.

5. Food Marketing Surveys: These are conducted weekly to give a clear indication of what food is available in the area.

6. Meteorological Data: These include records on daily rainfall and temperature data.

Implementation

Various ministries and organisations are involved in the collection of data, such as the Ministries of Agriculture, Health and Education and the National Milling Corporation. One of the major responsibilities of the Tanzania Food and Nutrition Centre is food and nutrition surveillance throughout the country, in cooperation with all the ministries involved in food and nutritional activities. The infrastructure available at the village level, in the districts and regions, and in the ministries is being utilised for the surveillance of food supply and nutritional status. The data are transmitted to the Tanzania Food and Nutrition Centre which, with the help of the Tanzania Bureau of Statistics, processes the information and advises the relevant ministries on appropriate courses of action.

Appendix I: Energy, Protein and Vegetable Requirements for an Ujamaa Village

Population of the village	450 families
Each family contains on average	5 people
Total population of the village	2,250 people
Population growth rate/year	2.5 per cent
Agricultural growth rate/year	3.0 per cent

1. Cereal needs (minimum) in an area without intensive livestock production — 250 kg/capita/year
   Total village needs (Robinson) — 562 metric tons/year

2. Protein needs are 15 kg/capita/year
   Total village needs — 34 metric tons/year
   Pulses are 25% protein, therefore total village needs (Nesheim) — 135 metric tons/year

3. Vegetable needs are 18 kg/capita/year
   Total village needs — 41 metric tons/year

4. Per cent storage losses for the village will follow the pattern shown below:

year		1	2	3	4	5
products:	cereals	30	20	15	10	5
	legumes	30	20	15	10	5
	vegetables	60	50	40	35	30

5. Total village production, in metric tons, taking storage losses and production increases into account:

year		1	2	3	4	5
products:	cereals	732	754	777	800	824
	legumes	176	181	186	192	198
	vegetables	65	73	80	88	88

6. Amount of cereals and legumes available, in metric tons, over the subsistence village needs:

year		1	2	3	4	5
products:	cereals	0	62	106	133	172
	legumes	0	15	23	32	42

Appendix II: Food Production Data

CEREALS

Year	1	2	3	4	5
Acreage	600	750	750	800	800
Yield/acre (mil. tons)	0.5	1.0	1.1	1.1	1.2
Total yield (mil. tons)	300	750	825	880	960
Net balance after storage losses	210	600	701	792	912

LEGUMES

Year	1	2	3	4	5
Acreage	300	450	450	500	500
Yield/acre	0.2	0.4	0.45	0.45	0.45
Total yield	60	180	203	225	225
Net balance after storage losses	42	144	173	203	203

GROUP II: REVIEW OF CURRENT ACTIVITIES IN THE FIELD OF NUTRITION IN KENYA AND GOALS FOR THE FUTURE

Since 1967, there have been a number of workshops and seminars in Kenya to discuss nutrition, and several drafts have been produced of a food and nutrition policy including organisational arrangements. For various reasons, these discussions and the papers produced have not resulted in an official food and nutrition policy. However, they have resulted in a number of intervention programmes and the establishment of training facilities, but these activities have not been co-ordinated. The organisations and ministries most directly involved in nutrition are:

Office of the President: In charge of famine relief. A major difficulty is the insufficient information system.

Ministry of Agriculture: Mainly concerned with food production with the aim of self-sufficiency. The Ministry is also responsible for storage, pricing policies, marketing and distribution of foodstuffs. The major intervention programme with regard to nutrition is carried out by the Home Economics Division with a large cadre of extension workers, trained at the University of Nairobi, Egerton College and Embu and Bukura Institutes of Agriculture. Some of the major shortcomings within the Ministry are as follows:

1. Emphasis on cash crops at the expense of foodcrops for subsistence,

2. Uneven geographical distribution. Marginal areas have not received enough attention,

3. National deficiency of legumes,

4. Milk and animal production and marketing too tightly controlled by statutory monopolies, and

5. Pricing policies which do not take account of nutritional considerations.

Ministry of Education: Nutrition education is part of the home science curriculum which is compulsory from Standard Four through Form Two, but only for girls. Students can choose to study home science in higher classes of secondary school. The University of

Nairobi and Kenyatta University College offer degrees and dip
respectively, and a number of schools offer training in cater

The shortcomings are that a large number of school childr
drop out in the lower standards and are thus not exposed to t
science curriculum, and boys are never given nutrition educat
the present school system.

Ministry of Housing and Social Services - Department of Socia
Services: The major programmes are:

1. The Family Life Training Centres, which are rehabili
tion centres for mothers with malnourished children.
During 1976/77, an estimated 1,600 mothers will atte
a three-week course.

2. Preschool feeding in dry, remote areas has recently
initiated, but only covers some of the day-care centr
in two districts. The supplementary food is combine
with nutrition education for the mothers.

The major shortfalls are the low coverage and low utiliza
of the large cadre of extension personnel. This could be imp
for example, by using literacy classes for nutrition education

Ministry of Finance and Planning: Overall responsibility for
national development planning and allocation of resources. T
Ministry has only to a certain extent recognised nutrition as
and parcel of national development.

Voluntary Organisations: The largest are the Catholic Relief
the National School Feeding Council and the Kenya Freedom from
Council. The C.R.S. is mainly involved in preschool feeding,
N.S.F.C. caters primarily to school feeding. The K.F.H.C. su
water projects in rural areas.

Ministry of Health: The Ministry is involved in both curative
preventive activities. Curative activities are carried out at
hospitals all over the country and involve physicians, medical
assistants and nurses.

Preventive activities including nutrition education as we
as distribution of dietary supplements are carried out by 150
nutrition field workers posted to health centres and hospitals
These field workers are enrolled nurses with an additional six
training in nutrition. They are supervised by Provincial Nutr
ists and the Nutrition Unit at ministry headquarters with a st
two Home Economists/Nutritionists. One Home Economist/Nutriti
trained as Health Educator is working with the Health Educatio
Furthermore, a Nutrition Laboratory focussing mainly on analys
Kenyan foodstuffs is attached to the Ministry. The Ministry h
realised the various shortcomings of its nutrition-related act

and has recently looked into the nutrition training of all workers in medical/nutrition job categories. A number of organisational measures to support nutrition activities have also been suggested, in particular coordination of nutrition activities with the Maternal and Child Health/Family Planning Programme. Possibly the 800 Family Planning Field Educators could carry out elementary nutrition education, as well as the detection of malnutrition cases and referral to health centres and hospitals.

Long-term Goal

The long-term goal is to improve the nutritional status of the population to the point that all Kenya citizens are adequately fed.

Guiding Principles

1. Emphasise the interrelationship of nutrition to the socio-economic development of the country.

2. Improve communication and coordination of activities among ministries and other agencies.

3. Identify, promote and coordinate nutrition programmes.

Tasks/Terms of Reference

1. Advise government on:
   a) national food and nutrition policies,
   b) overall financial requirements for implementing nutrition programmes,
   c) repercussions of various policies and programmes on nutritional status,
   d) possible measures to halt detrimental changes and promote valuable traditional customs related to food and nutrition, and
   e) resource allocation.

2. Ensure cooperation and coordination of activities among various ministries and agencies involved in planning and implementing food and nutrition programmes.

3. Assist ministries and agencies to devise suitable organisational frameworks for planning and implementing nutrition activities.

4. Promote public confidence in nutrition expenditure and demonstrate the short- and long-term payoffs of investment in nutrition.

5. Collect, analyse and disseminate available material from ministries and agencies and initiate surveys and research related to nutrition.

6. Consider and advise on all food and nutrition activities with regard to:
   a) application of research results,
   b) transfer of technology,
   c) nutrition education at all levels, and
   d) nutrition documentation.

7. Solicit financial assistance.

8. Maintain relationships with external agencies involved in nutrition.

9. Assist in organising seminars and workshops.

GROUP IIIa: INCREASED WHEAT CONSUMPTION IN WEST AFRICA

The Problem

In many countries of West Africa there has been a trend toward an increased consumption of bread and other wheat products. We were asked to trace the nutritional and related consequences of this trend and to develop and recommend programmes to reduce the negative (and to increase any positive) aspects of the trend. Attention was focussed on Ghana, Nigeria and Liberia.

As indicated in Table 1, of the three West African countries under consideration only Nigeria produces wheat. Table 2 shows the amount of wheat imported into the three countries from 1970 to 1974, and Table 3 shows the calories available from imported wheat and domestic staple crops.

Table 1. Wheat production in Ghana, Liberia and Nigeria (metric tons)

	1970	1971	1972	1973	1974
Ghana	-	-	-	-	-
Liberia	-	-	-	-	-
Nigeria	-	-	3	2	3

Table 2. Importation of wheat and wheat flour into Ghana, Liberia and Nigeria in metric tons (value in brackets in U.S. $1,000)

	1970	1971	1972	1973	1974
Ghana	85,000 (7,300)	47,000 (3,700)	89,000 (6,700)	101,000 (13,700)	113,000 (23,200)
Liberia	8,700 (1,100)	9,000 (1,400)	8,600 (1,100)	9,700 (1,900)	9,900 (2,300)
Nigeria	267,000 (22,000)	400,000 (34,000)	317,000 (35,000)	460,000 (59,000)	331,000 (82,000)

Table 3. Calories available from wheat and domestic staple crops

	Wheat Flour Imports*	Domestic Production of Cereals, Roots and Tubers* (thousand metric tons)	Total Supply*	Imports as a percent of total supply
Ghana				
1972	89	1886	1975	5
1973	101	1989	2090	5
1974	113	2052	2165	5
Liberia				
1972	8	224	232	3
1973	10	223	233	4
1974	10	280	290	3
Nigeria				
1972	319	14,619	14,938	2
1973	455	12,643	13,098	3
1974	331	15,212	15,543	2

* in terms of grain equivalent.

Nutritional and Related Consequences

Wheat flour is relatively high in calories and protein, for instance as compared with cassava flour. For each 100g of flour, cassava provides 342 calories and 1.5 units of protein and wheat provides 350 calories and 10.0 units of protein. If the amount of wheat present in commercially produced bread is decreased and the proportion of other types of flour increased, the loss of protein in the bread can be compensated by increased production and consumption of local foods such as cassava, rice, yams, sorghum, millet and legumes.

The cost of food for lower income groups will not increase so long as the cost of these local staples does not rise. The traditional diet consists of a combination of carbohydrates and protein in the form of beans and/or fish served with rice. Bread made from wheat could be a beneficial addition to this diet because of its nutrient value and its convenience, but these advantages are outweighed by the fact that it is much more expensive than locally available foods. In addition, the importation of wheat is a drain on national foreign exchange reserves and causes some increase in the conjestion of harbours. The preparation, transport and marketing of bread add further to its high cost.

Recommended Interventions

1. Compulsory mixing of wheat flour with cassava or rice flour after further research,

2. Tax on the importation of wheat to restrict its availability, and

3. Government subsidy to indigenous products in the form of fortification.

GROUP IIIb: CHANGE FROM BREAST FEEDING TO BOTTLE FEEDING IN WEST AFRICA

by
Hutton Addy

It has largely been accepted that breast feeding is a widespread practice among the majority of lactating women in West Africa. African women are known to lactate profusely and to breast-feed their children usually until the next pregnancy, while even older children could be suckled in moments of stress.

Mathews (1955) referred to the maintenance of breast-feeding in Yoruba women. He found that at the age of 10 months no baby had been taken off the breast by its mother, and that only 4 out of 380 mothers attending a post-natal and follow-up clinic had totally weaned their babies at 15 months. He also found that the rate of growth of these infants during the first 6 months of life was satisfactory and comparable to that of British infants.

Omololu (1972) reported that the incidence of breast-feeding in rural Nigeria was still 100 per cent.

Although there are not many published data similar to those from Nigeria, the clinical impression from other West African states had been that breast-feeding had been almost universal and spontaneous, that it was carried on for long periods, usually over a year and often for two or more years, and that lactation failure was uncommon. It was also known that where there was no breast milk for the infant, such as through the death of the mother, this was almost certainly a death warrant for the infant.

In the past 20 years the countries of West Africa have been going through a phase of rapid transition from a largely traditional agricultural community toward an increasingly elitist, educated, technologically oriented community. One result of this trend has been increasing urbanisation with large movements of populations from the rural to the urban areas. A nutritional effect of this trend has been the increasing incidence of protein-calorie malnutrition in the urban and periurban areas, usually of the marasmic type, in contrast to the incidence of kwashiorkor in the rural setting. Much of this malnutrition in the urban areas, from clinical observations and also from published data, has been found to be related to the increased frequency of attacks of diarrhoeas, resulting from the increased use of bottle feeding in unsanitary environmental conditions.

This increasing trend in the bottle feeding of infants in West Africa in the urban and periurban areas has become a cause for some concern. Many of the families in these areas are newly arrived from the rural areas and to a large extent uneducated. They have left their previous agricultural subsistence occupations to work in a money economy and may either be unemployed in the cities or receiving wages that barely provide enough to meet the nutritional needs of the family.

Orwell et al. (1974) have commented on the dramatic decline in breast feeding in Ibadan women. They observed that only 25 per cent of mothers were feeding their children entirely on the breast, the rest combining bottle feeding with breast feeding. However, only 1 out of 500 mothers used bottle feeding exclusively. Their findings also indicated that the pattern of feeding now emerging was for mothers to breast feed their babies from birth and to introduce bottle feeding at less than 3 months, and then to introduce solids while the breast feeding continued and the bottle was dropped.

Van der May (1969) also noticed in Nigeria that more and more mothers were starting to use powdered milk for feeding their infants even when breast milk was abundant. Van der May discussed the effect of prosperity and breast or artificial feeding on infant mortality by showing figures obtained in the Netherlands in 1908.

Infant mortality per thousand for breast and bottle fed children, Netherlands, 1908.

Prosperity	Breast-Fed	Bottle-Fed
High	17	70
Low	63.5	311

He further argued that conditions in Nigeria in 1968 are to some extent comparable to those in the Netherlands in 1908, so figures for infant mortality for these years do not differ very much.

The causes of the decline in breast feeding are manifold:

1. Rapid urbanisation in much of West Africa has resulted in large shifts of population from the rural areas to the urban and periurban areas. Most of these families are either unemployed or in wage earning occupations which did not provide enough cash for their nutritional needs. In addition, the move away from the rural areas has deprived them of the food crops which they would otherwise have had in their villages from subsistence agriculture. In addition, many mothers have also to go to work to obtain additional wages for their family's needs, thereby reducing the period of breast feeding. The transition from the rural to the urban areas also removes mothers from the customs and mores of most traditional societies in West Africa which demand a prolonged period of breast feeding and a long interval before a mother can return to her husband. The result of this has been a much closer birth interval for the new urban mother.

2. Many mothers tend to imitate the trend set by their more fortunate elite sisters in bottle feeding their babies, without also realising that the latter have the environmental and financial resources needed to make bottle feeding successful. The tendency to emulation is strengthened by the observation that the children of elite mothers are usually healthy and strong.

3. High pressure sales techniques are used by milk companies to advertise their products in West Africa, similar to those methods used in the developed countries. The unsophisticated, uneducated or semi-educated mother is influenced by these techniques to try the products even when she cannot easily afford them, with resultant early cessation of breast milk secretion owing to lack of stimulus by suckling.

In 1971, Jelliffe coined the term "commerciogenic malnutrition" to indicate the degree of malnutrition prevalent in developing countries simply because of the use of commercially produced milk preparations that poor families are unable to afford. This influence has been observed not only in the large towns but also in remote villages. Van der May illustrates this point very eloquently when he relates that "one hardly believes one's eyes when, a few minutes after leaving Lagos airport, one sees on the left hand side of the road a giant panoramic poster, featuring a fat bouncing baby saying: Welcome to Nigeria--where babies are happy and healthy--, and on the right hand side of the poster there is a can of S.M.A. milk." In addition to advertisements by posters, the radio and television, representatives of milk companies (professional 'health nurses') visit hospitals and then advertise their products to the attending mothers.

4. Doctors, nurses and other members of the health profession have not actively encouraged mothers to breast feed, and this tacit acceptance of the practise of bottle feeding has tended to provide support for the underprivileged mother who wants to bottle feed her child. Tacit acceptance on the part of the medical profession is also indicated by the obvious good relations between the milk companies and top figures in the medical profession. Milk companies are known to finance or support conferences of the medical profession and to offer gifts such as calendars, diaries and posters.

The Division of Maternal and Child Health for prenatal and well-children clinics has developed a baby feeding chart which is used in teaching health education. This chart tends to suggest a preference toward complementary and supplementary feeding as opposed to breast feeding. However, the nutritional values of the foods used in the chart may prove to be of required standards. The baby food chart as developed by the Division of Maternal and Child Health for Prenatal and Well Children Clinics in Liberia, which is being used on an increasingly large scale in Liberia, is shown below:

<u>At one month of age</u>:

Orange juice, grapefruit juice, pineapple juice or lime juice--approximately twelve teaspoons daily

At three months of age:

Ripe mashed bananas

At four months of age:

Banana cereal, plantain cereal, eddoe cereal and other imported baby foods

At six months of age:

Green pawpaw soup, green banana soup, rice, beniseed, peanut and fish mixture, pumpkin soup, ripe pawpaw, potato greens, pigeon peas, fish, meat, butter peas, mashed eddoes and yam, eggs, whole milk

At nine to twelve months of age:

Dried skim milk

Over twelve months of age:

Continue milk, meat, fish, eggs and juice in addition to family's regular diet

5. Lack of adequate training for medical personnel in infant feeding, stressing the value and advantages of breast feeding and pointing out the dangers of bottle feeding, has tended to diminish the importance of breast feeding compared with bottle feeding. Most books on pediatrics devote only a few lines to the discussion of breast feeding, but several pages to bottle feeding.

6. In Liberia, it has been found that mothers tend to have inadequate breast milk supply after four to six months.

The consequences of this declining trend in breast feeding are becoming obvious in West Africa.

1. There is increased incidence of nutritional marasmus in children from urban and periurban areas of the region, as indicated by published articles or by observations of the increase at children's clinics. Infants fed on breast milk show good growth compared with children on bottle feeding (Omololu, 1975) until supplementary feeds are introduced after about the sixth month (Van der May, 1964).

2. It is known that some infants fed on cow's milk protein develop intolerance to it manifested by allergic reactions such as gluten-induced enteropathy and eczema (Gothefors et al., 1975). These conditions are known to be more frequent in developed countries where bottle feeding is extensively practised and rare in developing countries where breast feeding is much more common.

3. The decline in breast feeding has reduced the beneficial effects of the anti-infective properties of human milk and caused an increased incidence of diarrhoeal diseases and respiratory infections (Gothefors et al., 1975). This leads to increased morbidity and mortality, especially in the age group one to four years. Breast milk is sterile, readily available at the right temperature and feeding requires no elaborate preparation. It supplies the necessary ingredients for the infant in the correct proportion and form (Omololu, 1975). In Ghana diarrhoeal disease is the major cause of morbidity and mortality in the age period one to five years often associated with protein-calorie malnutrition.

4. The high cost of cow's milk formulas and the low wages of the semi-literate urban or periurban dwellers in West Africa lead to the use of dilute milk formulas for feeding the infant, prepared in unsanitary conditions. Diarrhoeal diseases are therefore frequent in these children, and they are often treated by being taken off the milk feed and given water or rice water.

Recurrent diarrhoea therefore leads to repeated reduced calorie intake which ultimately leads to nutritional marasmus. In Liberia, the mortality among children shows the significance of nutritional deficiency in this group. Data from thirteen hospitals for the mortality of children for the period of 1970 to 1975 are as follows (total 722 deaths):

	mortality
Anaemia	311
Kwashiorkor	196
Marasmus	135

5. An important consequence of this decline in breast feeding in West Africa which has not so far been given any consideration by governments is the replacement of a very important natural resource, easily available to the country and involving very little cost of production, by cow's milk preparations which involve the expenditure of our countries' scarce foreign exchange reserves for their purchase (Berg, 1973). In addition to importing cow's milk preparations, feeding bottles and nipples, cooking utensils, refrigeration for the prepared milk and fuel are required, much of which involves additional expenditure of foreign exchange. It has been estimated that a child who is breast fed through the first two years of its life receives an average of 375 litres of breast milk, which would cost about $140 if it were cow's milk, not including the necessary accessories mentioned above. The total cost in foreign exchange expenditure would be considerable.

Interventions

It is proposed to mount a programme aimed at slowing down and ultimately stopping the decline in breast feeding in the population over a period of three to five years, and to reverse the trend to return to one hundred per cent breast feeding, especially in the lower socio-economic group, at the end of seven years.

Since the two major determinants of the decline in breast feeding in West Africa have been high-pressure advertising and the increased practise of bottle feeding by the women of higher socio-economic status in the community, action should be taken to counteract the effect of these two factors. Other activities will aim at supporting these initial actions and also neutralising the other causal factors mentioned earlier.

1. The governments of West African countries would be asked to commit themselves to the control of advertising of cow's milk formulas by limiting the extent of advertising and the techniques used, especially the high-pressure claims concerning the value of cow's milk preparations. The governments should also commit themselves to taking legal action against those companies which make unjustified claims for their products.

2. Since many mothers of low socio-economic status imitate the practises of their more educated sisters (the trend-setters), it should also be demonstrated that some of the privileged mothers also breast feed their children. Women community leaders (e.g. leading professional or social women) who have been breast feeding their children will be recruited to talk about the benefits and advantages of breast feeding. This will have a direct appeal to other mothers and provide inspiration for them to continue to breast feed or revert to breast feeding their children. Talks will be given on the radio or television, and articles on breast feeding will be written for literate mothers. Television programmes will also demonstrate mothers breast feeding their children in natural settings, in an attempt to reduce the feeling of reserve which some mothers have developed toward breast feeding.

3. A major aspect of the programme will be the reorientation of the medical and related professions, who have so far shown little interest in positively educating pregnant and lactating women concerning the advantages of breast feeding. This will involve a modification of the curricula in training schools for doctors, nurses and other health-related personnel, putting emphasis on breast feeding as a natural method of feeding infants evolved over thousands of years in response to biological needs. Its physiological, anti-infective and psychological advantages will be stressed, as well as the findings of the low association of breast feeding with carcinoma of the breast and of the body of the uterus. Its value as a contraceptive device will also be stressed, indicating its limitations but stressing the value this has in urban and periurban communities as well as in traditional societies for child spacing. In making comparisons between the value of breast milk and of cow's milk, instances will be indicated when the use of cow's milk becomes necessary, but the overall value of breast milk will be stressed.

4. The attitude of health personnel to breast feeding in maternity hospitals is also another avenue for intervention. Many doctors and nurses are not interested in answering questions on breast feeding by expectant and lactating mothers, whereas they are more willing to answer questions about bottle feeding. A change in the

training curriculum as stated above, and a programme of intensified seminars on breast feeding will heighten their interest in the subject. There is a tendency in maternity hospitals to establish a pattern of behaviour which discourages successful lactation. Mothers are made to feed their infants according to schedule, at three or four hourly intervals, which does not agree with the physiological need of the infant to suckle or of the mother to empty her breasts. Additional training of hospital staff will be aimed at reversing this trend.

5. Training of health workers at the community level will also emphasise the need not to change the traditional breast feeding patterns of the community unless there are obvious detrimental factors. Mothers in traditional communities learn about breast feeding by observing other women in the community, and traditional breast feeding practices have been established over a long period of time. Changing the pattern of breast feeding without considering these practises (e.g. by suggesting scheduled breast feeding) will cause uncertainty in the new mothers and lead to breast feeding failure. Community health workers will be taught to observe the practise of breast feeding in any community in which they work, encourage those aspects of the practise that are considered beneficial, and attempt to correct those practises that are considered harmful, taking into consideration how deeply these negative practises are entrenched in the culture. The attitude of superiority adopted by workers towards the local communities and the practice of didactic teaching will be eradicated.

6. One of the failings in the encouragement of breast feeding is the ineffectiveness of the promotion techniques used. Breast milk promotion will be undertaken in much the same way that commercial enterprises promote their products, employing the best available advertising techniques. Breast milk is a commodity that is an asset to infants and ultimately to our governments, and it should be promoted with all available expertise. Health education units of the ministries of health will be trained in modern techniques of advertising, or the governments will provide the finances necessary to employ commercial advertising agencies.

7. All work establishments employing women of child-bearing age will be required to provide creches to enable lactating women to bring their infants to work with them and to feed them at intervals during the course of the working day. Creches will be built from funds provided from the profits of companies and cooperatives, or from budget allocations from government agencies. They will be adequately furnished to provide optimal facilities for mothers to breast feed their children.

8. A health education programme will be directed primarily at women of low socio-economic status, to teach them the value of various nutrients, their normal nutrient needs and their special needs during pregnancy and lactation. The aim is to improve their nutritional status in order to meet their requirements during pregnancy and lactation. The emphasis will be on the use of local products, including those that may not be normally used by the community but are known to be of high nutritional value. Education will be done primarily by person-to-person communication, and secondarily by periodic talks on the radio.

9. The education programme of girls in primary, middle and secondary schools as well as at teacher training colleges will include nutrition education, emphasising the value and advantages of breast feeding and the dangers of bottle feeding, but also indicating the situations in which bottle feeding may be desirable. Concomitant with this will be a campaign depicting local, traditional nutritious foods and indicating their nutritive value. Instruction will also be given on the indications for and method of introducing supplementary feeds.

REVIEW OF THE CURRENT ACTIVITIES IN THE FIELD OF FOOD AND NUTRITION IN THE SUDAN

Nutrition activities are at present carried out by at least four ministries and the University of Khartoum. The ministries involved are the Ministry of Health, the Ministry of Education, the Ministry of Social Affairs and the Ministry of Agriculture. The activities which are presently being carried out will be summarised.

Ministry of Health

Nutrition activities in the Ministry of Health are carried out by the Nutrition Division, which was established in 1966. These activities may be summarised as follows:

1. Systematic collection of information regarding food consumption patterns of different socio-economic groups and the nutritional status of pre-school children.

2. Establishment of growth norms for infants and young children in the Sudan.

3. Creation of Provincial Units to provide minimum nutrition services and also serve as monitoring units.

4. Nutrition education of mothers through the health agencies and the Maternal and Child Health Centres.

5. Participation in the nutrition component of the professional training of doctors, nurses, health visitors, health inspectors and medical assistants.

6. Nutrition research is planned but not very much is done at present.

7. Pre-school feeding programme carried out jointly by the Ministry of Health and the Catholic Relief Services.

Ministry of Education

The nutrition project in the Ministry of Education was started by the Freedom From Hunger Campaign (F.F.H.C.) using funds donated by the Canadian Junior Red Cross in 1964. A Nutrition Training Centre was established in the Ministry of Education in Khartoum. The activities of this Centre are as follows:

1. Training home economics teachers for primary schools and junior secondary schools. Teaching food and nutrition as part of the education programme of the Teachers Training Institute.

2. Short-term courses for nutrition educators emphasising methods of teaching and extension. These trainees are assigned to Adult Education and Community Development Centres. Several such centres have been established in the provinces.

3. A four-year diploma course in home economics was developed in 1969 at the Higher Teachers Training Institute with the help of UNESCO. In 1975 the H.T.T.I. became the Faculty of Education in the University of Khartoum and will offer a degree course in home science.

In addition, the Head University College for Women is a private college offering a four-year diploma in home science and community care. Finally, the Shambat Institute of Agriculture offers a three-year post secondary diploma course in agriculture. The girl students are given special courses in food and nutrition as part of their course. After their training, they are employed in the Agriculture Extension Service of the Ministry of Agriculture.

Ministry of Social Affairs

The activities of this ministry are carried out through Community Care Centres for adults and nurseries and kindergartens for pre-school children. At the nurseries and kindergartens a mid-day meal is provided for the children. The ministry also maintains an orphanage centre for pre-school children where all meals and health care are provided.

Ministry of Agriculture

A Food Administration was recently established within the Ministry of Agriculture, Food and National Resources. Its main objective is to collect information on food production and availability. It does not have any nutrition activities at present.

University of Khartoum

There is no Department of Human Nutrition in any of the faculties of the University of Khartoum at present. Nutrition teaching and research are carried out independently by various departments in the medical, agricultural and veterinary faculties. However, it is expected that the Home Science Department in the Faculty of Education will offer a degree in home science where human nutrition will be emphasised.

Conclusion

It is clear from this brief review that the different food and nutrition activities in the Sudan lack co-ordination and clear objectives and thus, have no tangible impact on the nation's food and nutrition problems.

CLOSING REMARKS BY THE HONORABLE DR. JULIA OJIAMBO, M.P.,
ASSISTANT MINISTER FOR HOUSING AND SOCIAL SERVICES

Mr. Chairman, distinguished guests, ladies and gentlemen, I welcome this opportunity to make the closing remarks at this Seminar on Nutrition Planning and Policy for Africa. Firstly, I would like to say how pleased we in Kenya are to host this very important seminar and to welcome to our country, delegates from nine other countries of Africa. Secondly, we are happy to have had this opportunity to meet this high-calibre, interdisciplinary delegation attending this seminar. I do hope that those of you who have visited with us for the first time have had some time off to see Kenya outside the city of Nairobi.

Leading world experts in ecosystems and natural resources have pointed out the fact that food shortages remain the world's most pressing and urgent problem, in the wake of an ever-increasing world population (at an average rate of 2.2 per cent per year). In the third world, where food production is much below the minimum requirements for the population, the population growth rate is rising even more steeply, as in Kenya, up to 3.5 per cent per year. We are concerned about famine in a number of countries including those in Central Africa and Southern Asia. A seminar on nutrition policy and planning in Africa is, therefore, a most timely event.

While a nation may be self-sufficient in its own domestic food production, nutrition problems cross social, economic and political borders; and thus, policy and planning in the area of nutrition requires interdisciplinary, international cooperation, and indeed, a global approach. The underprivileged communities in the world suffer from under-nutrition with its well-known deficiency diseases, i.e. kwashiorkor, pellagra, anaemias, goitre and many others; and the wealthier nations, on the other hand, also suffer from over-nutrition and its array of nutritional disorders, e.g. obesity, heart, kidney and other diseases, the so-called diseases of affluence.

Africa at this point in time has an advantage in terms of policy formulation and planning for her development strategies as she can draw from experiences available both from the under-privileged and privileged nations of the globe and can come up with a more balanced, and more reasonable food and nutrition programme aimed at improving the quality of life for her future generations.

We in Kenya have realised that the solution to nutrition problems requires a multi-disciplinary approach and that it also needs the efforts of many different government ministries, non-government organisations and international agencies. We are, however, aware of the fact that our efforts are limited by the lack of a coordinating body, a body that would be responsible for the formulation of policy and planning strategies, in order for our many efforts to be directed effectively to a common goal, that is the achievement of a better quality of life for many of our citizens in the vulnerable groups (children, mothers of child-bearing age, the sick and the wananchi in general). Lack of an

adequate food supply to feed Kenyans is not our problem. Ken
been blessed with rich agricultural resources but, as I have
mentioned, poor nutrition exists even among the rich nations,
segments of our population continue to be the victims of malnu
of all types in the midst of plenty of food in Kenya.

Several Kenya Government ministries are involved in one
another in nutrition work. The Ministry of Housing and Socia
is involved in a number of strategies, including the feeding
in day-care centres, nutrition rehabilitation in family life
and the provision of food to pre-school children in arid area
country.

The Ministry of Health has a vital role to play in three
areas, namely, the assessment of nutritional status; the cur
medical prevention of malnutrition; and in training of health
at all levels in order that nutrition education becomes an in
part of public health activities.

The Ministries of Agriculture everywhere play a central
any comprehensive national food and nutrition policy. This i
the case in Kenya, if people are to have an adequate quantity
quality of food. As an agricultural country, Kenya wishes to
self-sufficient as possible in food production. There are ve
foods that we need to import and there are several that we co
produce and export. Our agricultural policy, therefore, is n
at an appropriate balance between cash crops and food crops.
nutritionist, I am concerned that in the past more agricultur
was placed on cash crops such as coffee, tea, pyrethrum, cott
sisal, rather than on cereals, root crops, legumes, horticult
and fruit. We inherited from the colonial era an agricultura
structure which neglected food crops. This, I am glad to say
being corrected.

The Ministry of Education has several roles to play in ou
nutrition programme, the most important being nutrition educa
school children and in Teacher Training Colleges. If our nat
produce a generation of children who understand the basis of
diet, we will have progressed a long way. Secondly, the Mini
Education must not only provide children with an adequate die
school, but also a quality diet. School children from primar
school form one big section of the vulnerable group, since th
requirements are very high for both their growth and activity
Another key ministry in devising a national food and nutritio
is the Ministry of Finance and Planning. In Kenya, this Mini
played an important role in efforts to establish the machiner
will allow the co-ordination of food and nutrition activities
many ministries involved and in efforts to formulate a nation
and nutrition policy.

Although I have given some examples of the role played by
ministries in Kenya in the field of nutrition, there are clea

ministries which must play some part. For example, the Ministry of Works is responsible for our roads, which make possible the transport of food and access to markets. The Ministry of Commerce and Industry is responsible for imports and also for enterprises in the food industry. The Ministry of Labour is concerned with the nutrition of employed persons. The Ministry of Water Development is involved in the supply of water for human consumption and for food production, and lastly, the Ministry of Cooperative Development plays a role in food production and marketing.

Having talked of the roles of different Government ministries in nutrition, we must also recognise the work done by non-government organisations. In this respect, many voluntary agencies have played a vital role in emergency feeding, especially during times of drought and famine. But several of these voluntary agencies are also deeply involved in longer-term projects of institutional feeding, of nutrition education and rehabilitation, and in a broad range of rural development projects. The Government of Kenya is highly appreciative of this contribution to the solution of a very important problem in the country.

The various United Nations agencies have, over the years, assisted us in our nutrition programmes. W.H.O. has conducted several nutrition surveys and has worked closely with the Ministry of Health in nutrition activities; F.A.O. has assisted many agricultural projects both in production and training; and UNICEF has been a donor of equipment and supplies needed for nutrition programmes. This week UNICEF is hosting in Nairobi a Seminar on Simple Village-Level Technology. For all this our Kenya Government is appreciative.

Finally, we must recognise the role of private industry in nutrition improvement. I would hope that in the future the nutritional implications of manufactured foods can be considered jointly by industrial entrepreneurs and Government authorities responsible for food and nutrition policy. For example, we as nutritionists deplore the fact that bottle feeding of infants is replacing breast feeding. This is a major cause of malnutrition and diarrhea in the children of poor mothers who adopt bottle feeding. Breast feeding has many overwhelming advantages. Similarly, we as nutritionists must be concerned with the increasing sale of bottled sodas and soft drinks which are purchased by persons in low-income brackets and which provide very little nutrition except calories and may contribute to tooth decay. A typical fizzy-flavoured soda at a cost of, say, one Kenya shilling provides a little sugar or synthetic sweetener, some fruit flavouring but practically no nutrients. That one shilling spent on maize, beans and greens (sukuma wiki) will provide the 1200 calories and 45 grams of protein, plus the full requirement of vitamins and minerals for a three-year-old child for a whole day. There is every reason for our food industry to be harnessed to serve a very important role in improving the nutrition of our people. In this respect, our meat and dairy industries, including the Kenya Meat Commission and Kenya Co-operative Creameries, have played a role in making available meat and dairy products at a price which is much cheaper than in most other countries in the world. The preservation of fruits and vegetables is also being undertaken. We need to encourage simple village-level technologies for food preservation.

From listening to your reports and from studying the agenda of your meeting, I understand that you have addressed yourselves to a very wide range of underlying nutrition problems and alternative strategies for improving the nutritional status of the African people. While our governments remain dedicated to economic development, the aim of this should be to improve the well-being of our people, including their nutrition, their health and, thus, their quality of life. Without this, development would have no meaning. An adequate food intake that provides all the nutrient requirements for all segments of the population must be our basic goal. We recognise that there are groups of our population who are particularly vulnerable to malnutrition. For example, early childhood malnutrition is a frequent cause of death, and in those who survive, it may result in impaired physical and mental development. We cannot afford to allow the next generation to be maimed in this way. Similarly, pregnant and lactating women have special nutritional needs that must be recognised.

I would like to stress here the very important role of women in nutrition. In our country women play a vital role in food production, and they have the main responsibility for rearing children. I understand that during a field visit, the participants in this seminar were able to see some of the activities of women's groups in Machakos District. We must provide more effective help to women--through training programmes, by the provision of services such as water supplies and village milling technology that will reduce the huge amount of time, energy and drudgery women spend on these tasks, and by support for women's self-help groups.

The subject of this seminar is one which is very important to me as a professional nutritionist, as an Assistant Minister in a ministry involved in nutrition activities, and as a member of parliament concerned with the well-being of the people of Kenya.

Our ministry will be very keen to study your recommendations with a view to consulting with other ministries of Government and taking appropriate action. The Government depends on expert advice of civil servants, particularly for the formulation of development plans. The technical experts in ministries need to formulate a simple but exact plan for the co-ordination of nutrition activities.

Finally, I would like to thank the seminar organisers for their excellent work in planning and running this seminar. I am grateful to Professor Michael Latham, an old friend and now a visiting Professor at the University of Nairobi, who directed the seminar; to Cornell University whose staff contributed much to the successful running of the seminar; to U.S.A.I.D. which financed it; and to the Institute for Development Studies which played host. But I would like especially to thank the participants who are all senior staff members in their countries for taking three weeks from their busy schedules to discuss this topic of food and nutrition policy which is so vital to African development.

With these remarks, Mr. Chairman, I declare this seminar now officially closed. Thank you.

SEMINAR PROGRAMME

Tuesday, June 1	Arrival of participants
Wednesday, June 2	9:30 - 10:30 a.m. Registration and introduction (Institute for Development Studies)
	11:00 - 12:30 Opening sessions of Seminar and reception (Boulevard Hotel)
	2:00 - 3:00 p.m. Professor Latham, "Nutrition Problems of Africa and Some Ordering of their Importance"
	3:00 - 3:30 Coffee/Tea/Discussion
	3:30 - 4:30 Professor Robinson, "Aggregate Availability and Consumption of Food in East Africa"
Thursday, June 3	9:00 - 10:30 a.m. Dr. Sanjur, "Socio-cultural Aspects of Food and Nutrition - I"
	10:30 - 11:00 Coffee/Tea/Discussion
	11:00 - 12:30 Dr. Morgan, "Nutrition and Agriculture"
	2:00 - 3:00 p.m. Mr. Adams, "Organisational Theory as Applied to Nutrition"
	3:00 - 3:30 Coffee/Tea/Discussion
	3:30 - 4:30 Professor Latham, "The Underlying Causes of Malnutrition and Diagnosis of the Nutrition Situation"
Friday, June 4	8:30 - 12:30 a.m. Field Trip - Visit to village-level food technology demonstration (UNICEF) at Karen and Ministry of Social Services Red Cross nutrition village near Limiru
	2:00 - 3:00 p.m. Dr. Sanjur, "Socio-cultural Aspects of Nutrition - II"
	3:00 - 3:30 Coffee/Tea/Discussion
	3:30 - 4:30 Visiting Lecturer, Mr. McDowell (UNICEF), "Utilization of Foods in Africa"

Saturday, June 5	8:30 - 10:00 a.m. Professor Robinson, "Factors Affecting Demand and Supply of Food"
	10:00 - 10:15 Coffee/Tea/Discussion
	10:15 - 11:45 Dr. Sanjur, "Socio-cultural Aspects of Nutrition - III"
	1:30 p.m. Optional trip to Amboseli National Park
Sunday, June 6	Optional trip to Amboseli National Park
Monday, June 7	9:00 - 10:30 a.m. Professor Robinson, "Food Marketing and Cost/Effectiveness"
	10:30 - 11:00 Coffee/Tea/Discussion
	11:00 - 12:30 Professor Latham, "The Consequences of Malnutrition and Options for the Solutions to Nutrition Problems"
	2:00 - 3:00 p.m. Dr. Morgan, "The Role of U.N. Organisations in Food and Nutrition Policies"
	3:00 - 3:30 Coffee/Tea/Discussion
	3:30 - 4:30 Mr. Adams, "Political Aspects of Nutrition Policy"
Tuesday, June 8	9:00 - 12:30 a.m. Mr. Pines, "Nutrition Planning - I"
	2:00 - 4:30 p.m. Nutrition Simulation Game - I
Wednesday, June 9	9:00 - 12:30 a.m. Mr. Pines, "Nutrition Planning - II"
	2:00 - 4:30 p.m. Nutrition Simulation Game - II
Thursday, June 10	9:00 - 12:30 a.m. Mr. Pines, "Nutrition Planning - III"
	2:00 - 4:30 p.m. Nutrition Simulation Game - III

Friday, June 11	9:00 - 12:30 a.m. Free
	2:00 - 3:00 p.m. Mr. Pines, "Nutrition Planning - III, cont."
	3:00 - 3:30 Coffee/Tea/Discussion
	3:30 - 4:30 Working groups
Saturday, June 12	9:00 - 10:00 a.m. Professor Nesheim, "Protein in Human Nutrition"
	10:00 - 10:30 Coffee/Tea/Discussion
	10:30 - 12:00 Working groups
Sunday, June 13	Free
Monday, June 14	9:00 - 12:30 a.m. Working groups
	2:00 - 4:30 p.m. Professor Slater, "Food Systems of Cassava Dependent People"
Tuesday, June 15	All-day field trip to Machakos District
Wednesday, June 16	9:00 - 10:30 a.m. Professor Nesheim, "Nutrition and Small Animal Production"
	11:00 - 11:30 Coffee/Tea/Discussion
	11:30 - 12:00 Professor Slater, "Concepts of Cassava Case Study as Applied to Maize Dependent People"
	2:00 - 4:30 p.m. Working groups, Report preparation
Thursday, June 17	9:00 - 10:30 a.m. Report presentation and discussion
	10:30 - 11:00 Coffee/Tea/Discussion
	11:00 - 12:30 Report presentation and discussion
	2:00 - 3:30 p.m. Report presentation and discussion
	3:00 - 5:30 Free
Friday, June 18	9:00 - 10:30 a.m. Dr. Maletnlema, "The Situation in Tanzania"
	10:30 - 12:30 Free

Friday, June 18, cont.	2:00 - 3:00 p.m. Final presentation of reports
	3:00 Closing remarks by the Honorable Dr. Julia Ojiambo, Assistant Minister for Housing and Social Services
Saturday, June 19	9:30 - 11:00 a.m. Final Plenary Session
	11:00 - 11:30 Coffee/Tea/Discussion
	11:30 - 12:30 Evaluation Session
	1:30 p.m. Closing Luncheon
Sunday, June 20	Departure from Nairobi

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